

# **500 Fifth Avenue North**



## **Final Environmental Impact Statement**

**Date of Issue: August 31, 2006**

**City of Seattle  
Department of Planning and Development**

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The intent and purpose of this Final Environmental Impact statement is to satisfy the procedural requirements of the State Environmental Policy Act (RCW 43.21c) and City Ordinance 114057. This document is not an authorization for an action, nor does it constitute a decision or a recommendation for an action; in its final form it will accompany the final decision on the proposal.

**Final Environmental Impact Statement**  
**for**  
**500 Fifth Avenue North**  
**Master Use Permit Application No. 3003599**

City of Seattle  
Department of Planning and Development

Prepared in Compliance with the  
State Environmental Policy Act of 1971  
Chapter 43.21 C, Revised Code of Washington

SEPA Rules, Effective April 4, 1984  
Chapter 191-11, Washington Administrative Code

City of Seattle SEPA Ordinance 114057 Seattle Municipal Code Chapter 25.05

Date of Issue: August 31, 2006



## Preface

On April 27, 2006, the City of Seattle Department of Planning and Development (DPD) issued a Draft Environmental Impact Statement (DEIS) for the proposed 500 Fifth Avenue North project. The issuance of the DEIS was followed by a 42 day agency and public review period which ended on June 9, 2006. During the review period, DPD conducted two public hearings, on May 9, 2006 at 6:30 p.m. and on June 7, 2006 at 5:30 pm. Both hearings were held in Room 1 of the Queen Anne Community Center, 1901 First Avenue West, Seattle, Washington.

This document is a Final Environmental Impact Statement (FEIS). It fully incorporates the information contained in the DEIS, comments received on the DEIS during the public review period, responses to those comments, and additional information developed in response to comments.

The scope of this document was determined in accordance with the scoping process required by the Seattle SEPA Ordinance (SMC 25.05.408). The required scope addresses those elements of the environment in which the presence or potential for significant adverse impacts is probable. A public notice was issued on October 20, 2005 stating that the project would require an EIS and inviting public and agency comments on the scope of the DEIS. A public scoping meeting was held on the evening of November 9, 2005 in Room 1 of the Queen Anne Community Center, 1901 First Avenue West, Seattle, Washington. The 30-day comment period ended on November 21, 2005. No comments were received.

The Seattle Department of Planning and Development (DPD) conducted a pre-application meeting with the applicant on October 6, 2005 and coordinated an early design review of the project on November 2, 2005. Based on DPD's early review of the project, and in the absence of any scoping comments, DPD determined that the project has the potential to result in significant adverse impacts on only one element of the environment: transportation. There will also be potential impacts from construction (air quality, noise and transportation). It is not anticipated that there will be a significant adverse impact on other elements of the environment, and these elements are eliminated from detailed study. Summary information on the project's effects on these elements of the environment is provided beginning on page vi.

This FEIS contains:

- A summary of the EIS including a discussion of impacts and mitigation measures relevant to the alternatives (Chapter 1.0);
- A description of the project alternatives (Chapter 2.0);
- A description of the affected environment, environmental impacts, mitigating measures and significant unavoidable adverse impacts (Chapter 3.0); and
- A complete set of comments received on the DEIS during the agency and public review period along with responses to all written comments (Chapter 4.0).

Separately from the EIS, the project is undergoing design review by the Magnolia-Queen Anne Design Review Board (DRB). The project applicant and architects presented the project to the DRB on November 2, 2005 for early design guidance and again on January 18, 2006 and July 19, 2006. Notice of the DRB meetings was provided to the public through postings at the project site and an opportunity was provided during the DRB meetings for public comment on the design. As a result of comments from the DRB and direction from the Bill & Melinda Gates Foundation, the project design has evolved from what was shown in the DEIS. The current designs for all alternatives (Alternatives 2a, 3a and 4a) are shown in Chapter 2 as Figures 2-2a, 2-3a and 2-4a. The total square footage at project build-out would not change, however the phasing might change. The Phase 1 development would likely increase from the approximately 420,000 square feet analyzed in the DEIS to approximately 600,000 square feet at opening day (approximately Year 2010). The effect of the design change on the analysis provided in the DEIS would be limited to traffic and transportation and construction impacts for the year of opening. The FEIS includes an added appendix (Appendix E) which provides an analysis of traffic and transportation impacts for year of opening 2010 if the Phase 1 of development is expanded from 420,000 square feet to 600,000 square feet. The total area for project build-out would remain the same as discussed in the DEIS.

Text changes to Chapters 1, 2 and 3 are denoted by a strike-out and underline format. Text additions are denoted by an underline and a parallel line in the margin. Text exclusions are indicated by a line through the words to be omitted.

Chapter 4 contains the comment letters and responses with the comment letters and applicable responses occurring in tandem. Each comment is identified with a number in the margin. Responses are coded with the number for the comment to which they refer.

DPD will proceed with this document as a FEIS and will make a final decision regarding the proposed 500 Fifth Avenue North project no less than 7 days following the issuance of this document.

## Fact Sheet

### Title and Description

The project is called 500 Fifth Avenue North. The proposal is for the construction of up to approximately 1,000,000 square feet of office space in a secure contiguous campus setting for the visitors and employees of the Bill & Melinda Gates Foundation on an approximately 8-acre site. The site is located on the east side of Fifth Avenue North between Mercer and Harrison Streets, across from the Seattle Center. This EIS also considers the potential impacts of the construction and operation of a visitor learning center to be located in the new parking garage authorized for construction under Master Use Permit 2500762 to be located on the east side of Fifth Avenue North between Republican and Harrison Streets. The visitor learning center will be approximately 26,000 square feet, including exhibit space open to the public and accessory office space. In addition, there is approximately 10,000 square feet of retail space planned for along Fifth Avenue North in the new parking garage.

### Sponsor and Approximate Date of Implementation

IRIS Holdings, LLC, a wholly-owned entity of the Bill & Melinda Gates Foundation, is the project sponsor. Construction is expected to begin in the fall of 2007 with occupancy of the first phase of development in 2010.

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### Lead Agency Information

The lead agency is the City of Seattle Department of Planning and Development (DPD).

Responsible Official: Molly Hurley, Senior Land Use Planner  
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                              700 Fifth Avenue, Suite 2000  
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Decisionmaker:       Diane Sugimura, Director  
                              Department of Planning and Development  
                              700 Fifth Avenue, Suite 2000  
                              Seattle, Washington 98104

### **Required Licenses**

Seattle Department of Planning and Development: Draft and Final EIS approval; master use permit; major phased development permit; building permit; grading permit; structural permit; mechanical permits; certification of occupancy; and energy code approval. If Alternative 4 is selected for implementation, the proposed skybridge may require additional environmental review.

Seattle Department of Transportation: Street-use permits; curb cut permit; and sidewalk approval.

Seattle Public Utilities: Sewer and water connections.

Seattle Fire Department: Fire Code inspections.

Seattle-King County Department of Public Health: Plumbing permits.

### **Authors and Principal Contributors to EIS**

This FEIS was prepared under the direction of the City of Seattle Department of Planning and Development. Research, analysis and document preparation were provided by the following firms:

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### **Date of Issuance of EIS**

August 31, 2006

### **Approximate Date of Final Environmental Action by Lead Agency**

Fall 2006.

### **Type of Lead Agency Decision**

A decision to grant, grant with conditions, or deny the proposed action will be made by the lead agency.

### **Additional Environmental Review**

No additional environmental review beyond this EIS is anticipated for the proposed action. If Alternative 4 is selected for implementation, the proposed skybridge may require additional environmental review.

### **Other Actions in the Site Vicinity**

A Master Use Permit has been issued for the future construction of a parking garage for 1,050 vehicles (one level above-grade parking, four levels below-grade parking), 4,000 square foot office for parking management; and 10,500 square foot of customer service office. The garage is to be located on Fifth Avenue North between Republican and Harrison Streets. The garage will be owned and operated by the Seattle Center and will replace the 1,217 surface parking spaces that currently exist on the site of the proposed action.

A separate Master Use Permit application may be submitted for an approximately 26,000 square foot visitor learning center and 10,000 square feet of retail that may be constructed on the north end of the new parking garage. If constructed, the retail space would be located along Fifth Avenue North. The potential environmental impacts of constructing and operating these uses are included within this EIS.

Separate from the proposed action, the City is planning to conduct remedial action for contaminated groundwater under the site. Project construction is not anticipated to affect the City's groundwater remediation action.

### **Other Related Material**

Background materials and support documents, including submittals to the Magnolia/Queen Anne Design Review Board prepared by the project architects (NBBJ), may be found at Seattle's Department of Planning and Development, File No. 3003599 (formerly 2501890).

### **Purchase of Copies**

Copies of the document have been printed and made available for public distribution at Department of Planning and Development, 700 Fifth Avenue, Suite 2000, Seattle, Washington 98104 in downtown Seattle. Additional copies, if needed, are available from the Department of Planning and Development at the reproduction cost of \$0.25 for the first page and \$0.10 for each additional page.

## Elements of the Environment

The following list of elements of the environment set forth in Chapter 25.05.444 of the Seattle Municipal Code are potential elements that might be included in an EIS. During the scoping period, DPD evaluated the project's potential adverse impacts on each of these elements of the environment. The Transportation items marked "reviewed" are discussed in Chapter 3 of this FEIS. These items were identified as a result of the scoping process carried out in compliance with Section 25.05.408 of the Seattle Municipal Code and determined by DPD to have a potential significant adverse impact on a particular element of the environment. Items marked "not reviewed" have impacts deemed nonsignificant for reasons briefly stated and are not discussed in the Draft or Final EIS. Construction impacts (air quality, noise and transportation) are also discussed in Chapter 3, Section 3.2 of this FEIS.

### I. Natural Environment

#### (a) Earth

- |       |                          |   |
|-------|--------------------------|---|
| (i)   | Geology                  | Not reviewed; site is relatively flat.                        |
| (ii)  | Soils                    | Not reviewed.   |
| (iii) | Topography               | Not reviewed; site is relatively flat.                        |
| (iv)  | Unique physical Features | Not reviewed; none exist.                                     |
| (v)   | Erosion/enlargement      | Not reviewed; not applicable to site of land area (accretion) |

#### (b) Air

- |       |             |  |
|-------|-------------|--|
| (i)   | Air Quality | Not reviewed for impacts from operation; proposal not expected to impact air quality. Dust during construction reviewed as part of Construction Impacts. |
| (ii)  | Odor        | Not reviewed; proposal not expected to generate odor.  |
| (iii) | Climate     | Not reviewed; proposal not expected to have impacts from wind.   |

#### (c) Water

- |       |   |   |
|-------|---|---|
| (i)   | Surface Water Movement, Quantity or Quality | Not reviewed; no surface water on site.   |
| (ii)  | Runoff/absorption                           | Not reviewed; water quality of runoff will be improved by the proposal by stormwater controls (change from existing parking lots) |
| (iii) | Floods                                      | Not reviewed; not applicable to this urban site.  |
| (iv)  | Groundwater                                 | Not reviewed; groundwater encountered during excavation would be routed to existing storm system.                                 |

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(v)	Public water supply	Not reviewed; water consumption of proposal not expected to have an overall impact on City of Seattle water supply.
(d)	Plants and Animals	
(i)	Habitat	Not reviewed; only usual urban birds can be reasonably expected on site; little habitat on site
(ii)	Unique species	Not reviewed; none reasonable expected to exist on site.
(iii)	Fish or wildlife	Not reviewed; not applicable to site.
(e)	Energy and Natural Resources	
(i)	Amount required/ rate of use/ efficiency	Not reviewed; energy consumption of the proposal (for both construction and operation) is not expected to have an overall impact on the City of Seattle energy supply.
(ii)	Source/availability	Not reviewed; electrical energy is provided by Seattle City Light.
(iii)	Nonrenewable resources	Not reviewed; the only use of resources would be for normal building materials.
(iv)	Conservation and renewable resources	Not reviewed; building is proposed to be LEED certified.
(v)	Scenic resources	Not reviewed; no impact to protected views are anticipated.
II.	Built Environment	
(a)	Environmental Health	
(i)	Noise	Not reviewed for impacts from operation; project will generate typical construction noise; traffic noise is not expected to measurably increase existing noise levels.
(ii)	Risk of explosion	Not reviewed; not applicable to project.
(iii)	Releases or potential releases to the environment affecting public health, such as toxic or hazardous materials.	Not reviewed; any hazardous materials that may be encountered during soil excavation as part of construction will be removed and disposed of in accordance with State law. Any groundwater encountered during construction that may be contaminated by hazardous materials will be removed and disposed of in accordance with State law.

## (b) Land and Shoreline Use

- |       |   |   |
|-------|---|---|
| (i)   | Relationship to existing land use plans and to estimated population | Not reviewed; project will meet Neighborhood Commercial 3 (NC3) code; no code departures are being requested.   |
| (ii)  | Housing   | Not reviewed; no housing demolition or creation will occur as a result of the project.  |
| (iii) | Light and glare   | Not reviewed; areas protected by SEPA policies would not be shaded by the proposal. Building setbacks of approximately 30 feet from curb line along Fifth Avenue North and approximately 80 feet from curb line along Mercer Street, and extensive landscaping between the building facades and sidewalk areas, would limit the potential for off-site light and glare impacts. |
| (iv)  | Aesthetics  | Not reviewed; project is subject to Design Review.  |
| (v)   | Recreation  | Not reviewed; existing Skate Board Park and basketball court are being relocated by the City of Seattle.  |
| (vi)  | Historic and cultural preservation                                  | Not reviewed; history of the site has been prepared by project architects (NBBJ). No historic buildings or features exist on the site.  |
| (vii) | Agricultural crops  | Not reviewed; not applicable to the site.   |

## (c) Transportation

- |       |   |   |
|-------|---|---|
| (i)   | Transportation systems                      | Reviewed.                                 |
| (ii)  | Vehicular traffic                           | Reviewed.                                 |
| (iii) | Waterborne, Rail                            | Not reviewed; not applicable to the site. |
| (iv)  | Parking                                     | Reviewed.                                 |
| (v)   | Movement and circulation of people or goods | Reviewed.                                 |
| (vi)  | Traffic hazards                             | Reviewed.                                 |

## (d) Public Services and Utilities

- |      |        |   |
|------|--------|---|
| (i)  | Fire   | Not reviewed; project will meet current Fire Code and will not include identified fire hazards. |
| (ii) | Police | Not reviewed; campus will include its own security force.                                       |



(iii)	Schools	Not reviewed; proposal will not affect schools.
(iv)	Parks or other recreational facilities	Not reviewed; proposal will not affect existing parks or create an additional demand on nearby parks or recreational facilities.
(v)	Maintenance	Not reviewed; project not expected to measurably increase maintenance needs for public services or utilities.
(vi)	Communications	Not reviewed; communication needs will be those typically required for office use.
(vii)	Water and Storm Water	Not reviewed; proposal will improve existing stormwater collection and filtration, resulting in improved stormwater quality.
(viii)	Sewer and Solid Waste	Not reviewed; sewer and solid waste needs will be those typically required for office use.
(ix)	Other government services or utilities.	Not reviewed; no impacts anticipated. Distribution power lines located along the Taylor Avenue alignment will be undergrounded along Fifth Avenue and along Broad Street. Permits will be obtained through SDOT. During Phase 1, transmission lines along Broad Street may be undergrounded between Sixth Avenue alignment and Republican Street. In future phases, additional power lines may be undergrounded.

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## **1.0 Summary**

### **1.1 Sponsor's Objectives for the Proposed Action**

The primary objectives for the Proposed Action include:

- To develop a multi-phase contiguous office campus consistent with the Seattle Land Use Code's development standards for the site's land use district.
- To accommodate the foundation's current and future space needs.
- To maintain a secure campus environment, without public streets and public walkways through the project site, of sufficient acreage to accomplish the foundation's current and future use needs.
- To demonstrate financial stewardship values to grantees, visitors and the public.
- To strive for sustainable design by conserving resources; and by enhancing local ecosystems by reducing heat, improving air quality and enhancing biodiversity.

### **1.2 Site and Site Vicinity**

The proposed more than 8-acre site is located at 500 Fifth Avenue North on the east side of Seattle Center and south of Seattle's Queen Anne Hill. The site is irregularly shaped, and is bounded by Fifth Avenue North on the west, Mercer Street on the north, Aurora Avenue North (State Route 99) and Broad Street on the east, and Harrison Street on the south. The site includes the vacated rights-of-way for Republican Street, Taylor Avenue North, and Sixth Avenue North. The property is zoned Neighborhood Commercial 3 (NC3) with a maximum height of eight-five (85) feet. It is also located within the Uptown Urban Center as designated by the City's Comprehensive Plan. Urban Centers are areas that are intended to be high density employment and residential areas that are well served by transit. See Figure 1-1 Site Vicinity.

The site is generally level, but slopes slightly downward toward the east. The site is currently developed with surface parking lots, a Skate Board park, a basketball court, and the Seattle Sonics practice facility. The Sonics lease of the practice facility expires in 2010. The City of Seattle is relocating the Skate Board park and basketball court. A new parking garage is being constructed for the Seattle Center adjacent to the site, on the east side of Fifth Avenue North between Harrison and Republican Streets, with relocation of affected utilities. The garage is intended to replace the surface parking. These actions are being undertaken separate from the proposed action.

An approximately 26,000 square foot visitor learning center and 10,000 square feet of retail space may be constructed on the north end of the new parking garage. If constructed, the retail space would be along Fifth Avenue North. The visitor learning center would include both exhibit space open to the public and accessory office space. The purpose of the visitor learning center will be for the public to learn about the foundation and its mission. The potential environmental impacts of constructing and operating these uses are included within this EIS.



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Figure 1-1  
**Site Vicinity**

### 1.3 Potential for Future Improvements to Area Roadways

There are improvement projects that are proposed for nearby roadways that could affect the design or traffic from the project:

- Mercer ~~Corridor Street Improvements~~ Project from Fairview Avenue North to Dexter Avenue North, proposed by the Seattle Department of Transportation (SDOT)
- ~~Aurora Avenue Improvements~~ Alaskan Way Viaduct and Seawall Replacement Project (AWVSR), proposed by the Washington Department of Transportation (WSDOT)
- ~~Reconnection of Street Grid (including Sixth Avenue across the eastern portion of the site)~~

If funding is available for these projects and construction proceeds, changes could be made to nearby roadways: (1) adjacent to the project site on Mercer Street between Fifth Avenue North and Dexter Avenue North; (2) Aurora Avenue North; and (3) Sixth Avenue North.

#### 1.3.1 Mercer Corridor Project (Fairview Avenue North to Dexter Avenue North)

The Mercer Corridor Project limits are from Fairview Ave N to Dexter Ave N. The Mercer Street improvements call for the conversion of Mercer Street from one-way to two-way operations, with the provision of three-travel lanes in each direction and additional turn lanes at intersections. The project includes an option to connect to the existing street network, including the Broad Street underpass, between Ninth and Dexter Avenues and an option to connect to the proposed street network that is part of the Alaskan Way Viaduct and Seawall Replacement Project (AWVSR).

SDOT is proceeding with design while completing a NEPA Environmental Assessment for the Mercer Corridor Project, and expects to complete the environmental documentation by the end of 2006. The design is expected to be completed to the 60% level by the end of 2006. SDOT plans to advertise the project for construction in August of 2008, and begin construction in late 2008, if funding is available.

#### 1.3.2 Alaskan Way Viaduct and Seawall Replacement Project (AWVSR)

WSDOT and the Federal Highway Administration (FHWA) are working to replace the existing Alaskan Way Viaduct and Seawall. The project is in environmental review and design for two alternatives, a tunnel option and an elevated structure. Construction would begin in 2009, assuming funding is available.

With both alternatives, improvements would be made to the Battery Street tunnel, and Mercer Street would be widened from four lanes to a seven-lane, two-way roadway between Fifth and Ninth Avenues. If implemented, the widening of Mercer Street would require up to 50 feet in additional setback from the existing roadway along the northern boundary of the project site.

In addition to widening of Mercer Street west of Dexter Avenue North, the proposed AWVSR

Project includes two alternatives for improvements to Aurora Avenue North: Lowered Aurora and Partially Lowered Aurora. The Aurora Avenue improvements would close Broad Street between Fifth and Ninth Avenues, close the ramps at Broad Street and Mercer Street, reconfigure access to/from Aurora Avenue to the north of the Battery Street tunnel, and reconnect the street grid in certain areas.

~~Planning for the Mercer Street improvements is more advanced than planning for the other proposed improvements. However, funding has not been finalized for any of these improvements, nor have construction schedules been established.~~

~~The Mercer Street improvements call for the conversion of Mercer Street from one-way to two-way operations, with the provision of three travel lanes in each direction and additional turn lanes at intersections. If implemented along the northern boundary of the project site, Mercer Street would be widened, requiring up to 50 feet in additional setback from the existing roadway.~~

~~The Aurora Avenue improvements would reconfigure access to/from Aurora Avenue to the north of the Battery Street tunnel.~~ The current proposal would lower Aurora Avenue between Roy Street and Denny Way, and would reconnect several streets across Aurora Avenue, including Harrison Street, Thomas Street, and possibly Republican Street. In addition, the connections between Aurora Avenue and the surface street network would be modified to provide additional/consolidate access points at Roy Street and Republican Street. Currently included in the reconnection of the streets across Aurora Avenue is the reconnection of Sixth Avenue between Roy Street and Harrison Street, through the proposed project site.

## 1.4 Description of the Alternatives

There are three *Action Alternatives* discussed in this EIS and the *No Action Alternative*. All *Action Alternatives* assume the existing surface parking will be replaced with a structured parking garage being constructed on the east side of Fifth Avenue between Harrison and Republican Streets under separate permits and environmental review. The preliminary design of *Alternative 4* would accommodate the reconnection of Sixth Avenue through the proposed project site if improvements are made to Aurora Avenue and Mercer Street.

Separately from the EIS, the project is undergoing design review by the Magnolia-Queen Anne Design Review Board (DRB). The project applicant and architects presented the project to the DRB on November 2, 2005 for early design guidance and again on January 18, 2006 and July 19, 2006. Notice of the DRB meetings was provided to the public through postings at the project site and an opportunity was provided during the DRB meetings for public comment on the design. As a result of comments from the DRB and direction from the Bill & Melinda Gates Foundation, the project design has evolved from what was shown in the DEIS. The current designs for all alternatives (*Alternatives 2a, 3a and 4a*) are shown in Chapter 2 as Figures 2-2a, 2-3a and 2-4a. The total square footage at project build-out would not change, however the phasing might change. The Phase 1 development would likely increase from the approximately 420,000 square feet analyzed in the DEIS to approximately 600,000 square feet at opening day (approximately Year 2010).



A table comparing the alternatives (Table 1-1) is provided at the end of this subsection.

#### 1.4.1 Alternative 1 – No Action

For the purpose of establishing a baseline condition, a *No Action Alternative* (*Alternative 1*) is studied. The *No Action Alternative* would leave the existing site as is, unless and until another proposal is approved. The *No Action Alternative* is defined by the following assumptions:

- Existing 1,217 space surface parking lot remains as is
- Existing access to parking lot remains as is
- The new Seattle Center garage is complete and operational
- The Sonics facility remains as is and operational until September 30, 2010; after that time there would be a similar use in the building
- Roadways remain as is (no [improvements to Mercer Street between Fifth Avenue North and Dexter Avenue North](#), Aurora Avenue North, or Sixth Avenue North [improvements](#))
- No sidewalk improvements are made onsite
- Existing utilities remain as is, except for utilities affected by construction of the Seattle Center garage

#### 1.4.2 Alternative 2a — 1,000,000 Square Foot Development Without Sixth Avenue North Improvements

[Similar in design to Alternative 3a](#), ~~This this~~ alternative would provide ~~a typical level~~ [1,000,000 square feet](#) of office campus development, ~~with standard width office buildings and surface parking~~, including ~~minimum wider~~ setbacks, ~~with no~~ improvements to Mercer Street, Aurora Avenue North or reconnection of Sixth Avenue North.

- Building square feet
  - [Opening day \(approximately Year 2010\) of Approximately approximately](#) 420,000 square feet ~~on opening day (approximately Year 2010)~~ with 450 parking spaces (204 spaces constructed on-site and 246 spaces provided by covenant in the adjacent Seattle Center Garage), [to approximately 600,000 square feet with 658 parking spaces \(412 spaces constructed on-site and 246 spaces provided by covenant in the adjacent Seattle Center Garage\)](#)<sup>1</sup>
  - Approximately 1,000,000 [square feet](#) at end of 15-year MPD (approximately Year 2025) with 1,226 parking spaces (980 spaces constructed on-site and 246 spaces provided by covenant in the adjacent Seattle Center Garage)
- Campus would maintain a secure environment for foundation workers and guests; there would be no public streets or public walkways through the project site.
- New Seattle Center garage is complete and operational
- No improvements made to Mercer Street [between Fifth Avenue North and Dexter Avenue North](#), Aurora Avenue North, or Sixth Avenue North

<sup>1</sup> [In addition to the impact analysis for full build-out of 1,000,000 square feet, this EIS includes an impact analysis for both the lower and higher ends of the potential Phase I development for Year 2010. See Appendices A and E, and Section 3.1.](#)



- Sidewalk improvements constructed along Fifth Avenue North and Mercer Street
- Sonics facility closed in 2010; site redeveloped for campus use
- Affected utilities would be relocated

#### 1.4.3 Alternative 3a – 900,000 Square Foot Site Development Without Sixth Avenue North Improvements

This alternative would provide a less dense or intense level of development than *Alternative 2a* ~~with narrower buildings, more open space, and wider setbacks~~. This alternative would be designed to accommodate 900,000 square feet **with no** improvements to Mercer Street, Aurora Avenue North or reconnection of Sixth Avenue North.

- Building square feet
  - ~~Opening day (approximately Year 2010) of Approximately approximately~~ 420,000 square feet ~~on opening day (approximately Year 2010)~~ with 450 parking spaces (204 spaces constructed on-site and 246 spaces provided by covenant in the adjacent Seattle Center Garage), to approximately 600,000 square feet with 658 parking spaces (412 spaces constructed on-site and 246 spaces provided by covenant in the adjacent Seattle Center Garage)<sup>2</sup>
  - Approximately 900,000 square feet at end of 15-year MPD (approximately Year 2025) with 1,226 parking spaces (980 spaces constructed on-site and 246 spaces provided by covenant in the adjacent Seattle Center Garage)
- Campus would maintain a secure environment for foundation workers and guests; there would be no public streets or public walkways through the project site.
- New Seattle Center garage is complete and operational
- No improvements made to Mercer Street between Fifth Avenue North and Dexter Avenue North, Aurora Avenue North, or Sixth Avenue North
- Sidewalk improvements constructed along Fifth Avenue North and Mercer Street
- Sonics facility closed in 2010; site redeveloped for campus use
- Affected utilities would be relocated

#### 1.4.4 Alternative 4a – 900,000 Square Foot Site Development With Sixth Avenue North Improvements

Like *Alternative 3a*, this alternative would provide a less dense or intense level of development than *Alternative 2a* ~~with narrower buildings, more open space, and wider setbacks~~. This alternative would be designed to accommodate 900,000 square feet **with** improvements to Mercer Street, Aurora Avenue North and a reconnection of Sixth Avenue North.

- Building square feet
  - ~~Opening day (approximately Year 2010) of Approximately approximately~~ 420,000 square feet on opening day (approximately Year 2010) with 450 parking spaces (204 spaces constructed on-site and 246 spaces provided by covenant in the adjacent Seattle Center Garage), to approximately 600,000 square feet with 658 parking

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<sup>2</sup> In addition to the impact analysis for full build-out of 900,000 square feet, this EIS includes an impact analysis for both the lower and higher ends of the potential Phase I development for Year 2010. See Appendices A and E, and Section 3.1.

- [spaces \(412 spaces constructed on-site and 246 spaces provided by covenant in the adjacent Seattle Center Garage\)<sup>3</sup>](#)
- Approximately 900,000 [square feet](#) at end of 15-year MPD (approximately Year 2025) with 1,226 parking spaces (980 spaces constructed on-site and 246 spaces provided by covenant in the adjacent Seattle Center Garage)
  - Campus would maintain a secure environment for foundation workers and guests; there would be no public streets or public walkways through the project site
  - New Seattle Center garage is complete and operational
  - Roadway configuration includes proposed improvements to Sixth Avenue North, Mercer Street [between Fifth Avenue North and Dexter Avenue North](#), and Aurora Avenue North
  - Sidewalk improvements constructed along Fifth Avenue North and Mercer Street
  - Sonics facility closed in 2010; site redeveloped for campus use
  - Affected utilities would be relocated

**Table 1-1**  
**Comparison of Action Alternatives**

	Alternative 2a (without 6 <sup>th</sup> Avenue N Improvements)	Alternative 3a (without 6 <sup>th</sup> Avenue N Improvements)	Alternative 4a (with 6 <sup>th</sup> Avenue N Improvements)
<b>Total approximate square feet</b>	1,000,000	900,000	900,000
<b>Phase I Development approximate square feet</b>	420,000 – <a href="#">600,000</a>	420,000 – <a href="#">600,000</a>	420,000 – <a href="#">600,000</a>
<b>Setback from Existing Fifth Avenue North Curb Line</b>	30 feet	30 feet	30 feet
<b>Setback from Existing Mercer Street Curb Line</b>	<a href="#">30-80</a> feet	80 feet	80 feet
<b>Access to Site</b>	Fifth Avenue North, Republican and Mercer Streets	Fifth Avenue North, Republican and Mercer Streets	Fifth Avenue North, Republican and Mercer Streets

### 1.4.5 Visitor Learning Center and Retail Space

With each action alternative, a visitor learning center and retail space may be constructed on the north end of the adjacent Seattle Center garage project. The purpose of the visitor learning center is for the public to learn about the Bill & Melinda Gates Foundation and its mission. The learning center would be approximately 26,000 square feet, including exhibit space open to the public and accessory office space. Consistent with other exhibit venues in Seattle, the visitor learning center is expected to be open to the public from 10 to 5 weekdays and 10 to 6 on weekends. If constructed, the retail space would be approximately 10,000 square feet and located along the Fifth Avenue North portion of the garage.

## 1.5 Impacts and Mitigating Measures

Table 1-2, located at the end of this chapter, describes, compares, and summarizes the impacts analysis for all of the alternatives, including potential transportation impacts and temporary construction impacts (air quality, noise and transportation).

<sup>3</sup> [Ibid.](#)

As discussed in Chapter 3, transportation impacts from the build-out of the action alternatives are anticipated to be mitigated except for the level of service (LOS) of Stewart Street/Denny Way and Howell Street/Yale Avenue intersections. The LOS at these two intersections would remain as potentially unavoidable adverse impacts. Construction impacts from development alternatives are anticipated to be mitigated.

Table 1-3 summarizes the mitigation measures discussed in Chapter 3 to mitigate for potential transportation and temporary construction impacts.

## **1.6 Secondary and Cumulative Impacts**

Secondary and cumulative impacts have been addressed as part of the primary transportation analysis. The transportation analysis incorporates pipeline projects and projected growth rates into the analysis of impacts.

**Table 1-2**  
**Summary of Potential Environmental Impacts**

	Environmental Impact by Alternative			
	Alternative 1 – No Action	Alternative 2a	Alternative 3a	Alternative 4a
<b>Initial Phase (Year 2010)</b>				
<b>Transportation</b>				
Traffic Volumes	An annually compounded growth rate of 0.5 percent plus 22 "pipeline" projects.	3,635 daily trips and <del>565-575</del> to 635 peak hour trips <u>with 420,000 sq. ft Phase 1. 4,850 daily trips and 770 to 845 peak hour trips with 600,000 sq. ft Phase 1</u> <del>No impacts evaluated below.</del>	Same as Alternative 2a.	Same as Alternative 2a.
Traffic Operations - Level of Service	As compared to Year 2005, two intersections would continue to operate poorly (Fairview Ave./Mercer St. in AM peak hour and Dexter Ave./Mercer St in PM peak hour ) and eight additional AM intersections and 11 additional PM intersections LOS would degrade.	<u>With a 420,000 sq. ft, Phase 1 development, Five-five additional AM intersections LOS would degrade (one to LOS E), and four PM intersections LOS would degrade to a LOS below that estimated for Alternative 1 (No Action) (two to LOS E). A 600,000 sq. ft. development would have the same effects on LOS as a 420,000 sq. ft. development with the exception being that one additional PM intersection would degrade (from LOS B to LOS C)</u>	Same as Alternative 2a.	Same as Alternative 2a. No improvements planned for Mercer St <u>between Fifth Ave N and Dexter Ave N</u> , Sixth Ave N, or Aurora Ave N would be complete prior to 2010.
Traffic Operations - Site Access	No impacts.	No impacts.	Same as Alternative 2a.	Same as Alternative 2a.
Transit & Rail	No impacts.	No impacts.	Same as Alternative 2a.	Same as Alternative 2a.
Non-Motorized Facilities	No impacts.	Increased use of non-motorized facilities with development. Redevelopment would enhance facilities adjacent to site. No impacts	Same as Alternative 2a.	Same as Alternative 2a.
Safety	As compared to Year 2005, there would be an Increased potential for impacts at three intersections due to	Possible proportionate increase in the probability of traffic accidents at 5 <sup>th</sup> Ave/Mercer St,	Similar to or slightly less than Alternative 2a.	Similar to or slightly less than Alternative 2a.

**Table 1-2 (Continued)**  
**Summary of Potential Environmental Impacts**

	Environmental Impact by Alternative			
	Alternative 1 – No Action	Alternative 2a	Alternative 3a	Alternative 4a
	increased traffic volumes (Fifth Ave /Mercer St, Ninth Ave /Mercer St, Westlake Ave/Denny Way).	NinthAve/Mercer St, and Westlake Ave/Denny Way.		
Parking	No impacts.	A potential parking supply deficit of 605 - 850 stalls without TMP and a potential deficit of 304 - 420 stalls with TMP.	Same as Alternative 2a.	Same as Alternative 2a.
<b>Build Out (Year 2025)</b>				
<b>Transportation</b>				
Traffic Volumes	An annually compounded growth rate of 0.5 percent. Plus 22 pipeline projects, no reduction.	5,600 daily trips and 985 to 1,050 peak hour trips. Impacts would be concentrated along the west site frontage intersections (Fifth Ave N at Harrison, Republican and Mercer Streets) and diffuse with progressive distance from the site.	5,100 daily trips and 885 to 945 peak hour trips. Impacts would be concentrated along the west site frontage intersections (Fifth Ave N at Harrison, Republican and Mercer Streets) and diffuse with progressive distance from the site.	Same as Alternative 3a except reduction of impacts along the west site frontage intersections (Fifth Ave N at Harrison, Republican and Mercer Streets).
Traffic Operations - Level of Service	Two intersections would continue to operate poorly (Fairview/ Ave/Mercer St in AM peak hour and Dexter Ave/Mercer St in PM peak hour)four additional AM intersections and seven additional PM intersections would degrade to LOS E or F.	Seven intersections would continue to operate at LOS F with or without Alternative 2a. Six additional AM intersections would degrade to a LOS below that anticipated with Alternative 1 (No Action), including two to LOS F and two to LOS E. Seven additional PM intersection LOS would degrade, including one to LOS F. Fairview Ave/Denny Way would be mitigated, Stewart St/Denny Way and Howell St/Yale Ave would remain potentially unavoidable adverse impacts.	Seven intersections would continue to operate at LOS F with or without Alternative 3. Six additional AM intersection LOS would degrade to a LOS below that anticipated with Alternative 1 (No Action), including four to LOS E. Five additional PM intersection LOS would degrade, including one to LOS F Fairview Ave/Denny Way would be mitigated, Stewart St/Denny Way and Howell St/Yale Ave would remain potentially unavoidable adverse impacts.	Similar to Alternative 3a except reduction of impacts along the west site frontage intersections along Fifth Ave N at Harrison, Republican and Mercer Streets. Fairview Ave/Denny Way would be mitigated, Stewart St/Denny Way and Howell St/Yale Ave would remain potentially unavoidable adverse impacts.
Traffic Operations - Site	No impacts.	No impacts.	Same as Alternative	Similar to Alternative

**Table 1-2 (Continued)**  
**Summary of Potential Environmental Impacts**

	Environmental Impact by Alternative			
	Alternative 1 – No Action	Alternative 2a	Alternative 3a	Alternative 4a
Access			2a.	2a but with additional site access along the newly created Sixth Ave frontage.
Transit & Rail	No impacts.	No impacts.	Same as Alternative 2a.	Same as Alternative 2a.
Non-Motorized Facilities	No impacts.	Increased use of non-motorized facilities with TMP. Redevelopment would enhance facilities adjacent to site. No impacts.	Same as Alternative 2a.	Same as Alternative 2a.
Safety	Increased potential for impacts at three intersections due to increased traffic volumes (5 <sup>th</sup> -Fifth Ave/Mercer St, Ninth Ave/Mercer St, Westlake Ave/Denny Way)	Possible proportionate increase in the probability of traffic accidents at Fifth Ave/Mercer St, Ninth Ave/Mercer St, and Westlake Ave/Denny Way.	Similar to or slightly less than Alternative 2a.	Similar to or slightly less than Alternative 2a.
Parking	No change to parking. No impacts.	A potential parking supply deficit of 577 stalls with TMP.	A potential parking supply deficit of 403 stalls with TMP.	Same as Alternative 3.
<b>Construction</b>				
Air Quality	No impacts.	Dust and temporary increase in vehicular emissions from construction equipment.	Same as Alternative 2a.	Same as Alternative 2a.
Noise	No impacts.	Temporary increase in sound levels from construction equipment and vehicles during daytime work days.	Same as Alternative 2a.	Same as Alternative 2a.
Transportation – Initial Phase	No impacts.	200 to 400 truck trips per day during the 2 to 4 month excavation phase; balance of construction truck trips will be approximately 50 to 75 per day.	Same as Alternative 2a.	Same as Alternative 2a.
Transportation – Build Out	No impacts.	The total amount of material to be removed is expected to be consistent with initial phase I. Truck trips are expected to be similar to initial phase. Phasing of future work is not yet known.	Similar to or slightly less than Alternative 2a.	Similar to or slightly less than Alternative 2a.

**Table 1-3**  
**Summary of Potential Mitigation Measures**

<b>Transportation</b>	
Traffic Operations	<ul style="list-style-type: none"> <li>• The project proponent would participate in the South Lake Union Transportation Plan aimed at improvements to area roadways.</li> <li>• A TMP is proposed to lessen the dependence of campus staff on single occupancy vehicles. The TMP goals and supporting elements would be consistent with City TMP requirements.</li> <li>• Optimization of signal timing is proposed at the Fairview Ave./Denny Way intersection to mitigate impacts from build-out of the development alternatives, to improve LOS during the PM peak hour.</li> </ul>
Parking	<ul style="list-style-type: none"> <li>• There is available off-street weekday daytime parking in the surrounding area to accommodate the potential parking demand of both the initial phase and full build-out of the campus.</li> </ul>
<b>Construction</b>	
Air Quality	<ul style="list-style-type: none"> <li>• Emissions from construction equipment and trucks would be reduced by using new and/or well-maintained equipment. Avoiding prolonged periods of vehicle idling and engine-powered equipment would also reduce emissions.</li> <li>• Trucking of material to and from the construction areas would be controlled to minimize traffic congestion during peak travel times. This would minimize secondary air quality impacts caused by reduced travel speeds.</li> <li>• Dust produced by construction activities could be reduced by spraying areas of exposed soils and construction roadways with water or dust suppressants. Areas that may be exposed for prolonged periods of time may be paved, planted with a vegetation ground cover, or covered with tarps or gravel, as necessary.</li> <li>• The amount of fugitive soil carried out of the construction area by exiting trucks can be minimized by wheel washing and by covering dusty truck loads.</li> <li>• Fugitive soil that is carried out of the construction area on existing vehicles can be reduced with an effective street-cleaning effort.</li> </ul>
Noise	<ul style="list-style-type: none"> <li>• To reduce the noise impact of construction on nearby properties, construction activities other than in totally enclosed floors could be limited to non-holiday weekdays between 7:30 A.M. and 6:00 P.M. and Saturdays from 9:00 A.M. to 5:00 P.M. Work outside these times should only be allowed if undertaken within the specific context of a noise-mitigation plan submitted to DPD and approved by the DPD planner.</li> <li>• Construction noise can be mitigated with the use of properly sized and maintained mufflers, engine intake silencers, or engine enclosures; and by turning off equipment when not in use.</li> </ul>
Transportation	<p>The owner(s) and/or responsible party(s) shall secure DPD Land Use Division approval of construction phase transportation and pedestrian circulation plans. These plans should consider impacts during any demolitions and during construction of the building. The plans shall address the following:</p> <ul style="list-style-type: none"> <li>• Ingress/egress of construction equipment and trucks.</li> <li>• Truck access routes, to and from the site, for the excavation and construction phases.</li> <li>• Potential temporary displacement/relocation of any nearby bus stops.</li> <li>• Information to be posted to provide drivers and pedestrians with advance notice of traffic lane or sidewalk closures, including locations of re-routing pedestrian movements.</li> <li>• Provision of safe pedestrian and vehicular circulation adjacent to the construction site through the use of temporary sidewalks, signs and manual traffic control (flaggers).</li> <li>• Regular sweeping and washing operations on streets adjacent to the site</li> <li>• Impacts and mitigation of trips associated with construction and/or demolition activities during major events at Seattle Center.</li> </ul>

## **2.0 Description of Alternatives**

### **2.1 Sponsor's Objectives for the Proposed Action**

The primary objectives for the Proposed Action include:

- To develop a multi-phase contiguous office campus consistent with the Seattle Land Use Code's development standards for the site's land use district.
- To accommodate the foundation's current and future space needs.
- To maintain a secure campus environment, without public streets and public walkways through the project site, of sufficient acreage to accomplish the foundation's current and future use needs.
- To demonstrate financial stewardship values to grantees, visitors and the public.
- To strive for sustainable design by conserving resources; and by enhancing local ecosystems by reducing heat, improving air quality and enhancing biodiversity.

### **2.2 Site and Site Vicinity**

The proposed more than 8-acre site is located at 500 Fifth Avenue North on the east side of Seattle Center and south of Seattle's Queen Anne Hill. The site is irregularly shaped, and is bounded by Fifth Avenue North on the west, Mercer Street on the north, Aurora Avenue North (State Route 99) and Broad Street on the east, and Harrison Street on the south. The site includes the vacated rights-of-way for Republican Street, Taylor Avenue North, and Sixth Avenue North. The property is zoned Neighborhood Commercial 3 (NC3) with a maximum height of eight-five (85) feet. It is also located within the Uptown Urban Center as designated by the City's Comprehensive Plan. Urban Centers are areas that are intended to be high density employment and residential areas that are well served by transit. See Figure 2-1 Project Site.

The site is generally level, but slopes slightly downward toward the east. The site is currently developed with surface parking lots, a Skate Board park, a basketball court, and the Seattle Sonics practice facility. The Sonics lease of the practice facility expires in 2010. The City of Seattle is relocating the Skate Board park and basketball court. A new parking garage is being constructed for the Seattle Center adjacent to the site, on the east side of Fifth Avenue North between Harrison and Republican Streets, with relocation of affected utilities. The garage is intended to replace the surface parking. These actions are being undertaken separate from the proposed action.

An approximately 26,000 square foot visitor learning center and 10,000 square feet of retail space may be constructed on the north end of the new parking garage. If constructed, the retail space would be along Fifth Avenue North. The visitor learning center would include both exhibit space open to the public and accessory office space. The purpose of the visitor learning center will be for the public to learn about the foundation and its mission. The potential environmental impacts of constructing and operating these uses are included within this EIS.





Figure 2-1  
**Project Site**

## 2.3 City of Seattle Permitting

The campus would be permitted by the City of Seattle as a "major phased development". This permit is available for sites over five acres that are being developed as a campus with at least 200,000 square feet of space. The permit approval is valid for 15 years and allows for staging or phasing of the construction over time.

The construction of this project would proceed in phases, under the major phased development permit. The initial phase for each Action Alternative is planned to be approximately 420,000 – 600,000 square feet.

## 2.4 Potential for Future Improvements to Area Roadways

There are improvement projects that are proposed for nearby roadways that could affect the design or traffic from the project:

- Mercer Corridor Street Improvements Project from Fairview Avenue North to Dexter Avenue North, proposed by the Seattle Department of Transportation (SDOT)
- Aurora Avenue North Improvements Alaskan Way Viaduct and Seawall Replacement Project (AWVSR), proposed by the Washington Department of Transportation (WSDOT)
- Reconnection of Street Grid

If funding is available for these projects and construction proceeds, changes could be made to nearby roadways: (1) adjacent to the project site on Mercer Street between Fifth Avenue North and Dexter Avenue North; (2) Aurora Avenue North; and (3) Sixth Avenue North.

### 2.4.1 Mercer Corridor Project (Fairview Avenue North to Dexter Avenue North)

The Mercer Corridor Project limits are from Fairview Ave N to Dexter Ave N. The Mercer Street improvements call for the conversion of Mercer Street from one-way to two-way operations, with the provision of three-travel lanes in each direction and additional turn lanes at intersections. The project includes an option to connect to the existing street network, including the Broad Street underpass, between Ninth and Dexter Avenues and an option to connect to the proposed street network that is part of the Alaskan Way Viaduct and Seawall Replacement Project (AWVSR).

SDOT is proceeding with design while completing a NEPA Environmental Assessment for the Mercer Corridor Project, and expects to complete the environmental documentation by the end of 2006. The design is expected to be completed to the 60% level by the end of 2006. SDOT plans to advertise the project for construction in August of 2008, and begin construction in late 2008, if funding is available.

### 2.4.2 Alaskan Way Viaduct and Seawall Replacement Project (AWVSR)

WSDOT and the Federal Highway Administration (FHWA) are working to replace the existing

Alaskan Way Viaduct and Seawall. The project is in environmental review and design for two alternatives, a tunnel option and an elevated structure. Construction would begin in 2009, assuming funding is available.

With both alternatives, improvements would be made to the Battery Street tunnel, and Mercer Street would be widened from four lanes to a seven-lane, two-way roadway between Fifth and Ninth Avenues. If implemented, the widening of Mercer Street would require up to 50 feet in additional setback from the existing roadway along the northern boundary of the project site.

In addition to widening of Mercer Street west of Dexter Avenue North, the proposed AWVSR Project includes two alternatives for improvements to Aurora Avenue North: Lowered Aurora and Partially Lowered Aurora. The Aurora Avenue improvements would close Broad Street between Fifth and Ninth Avenues, close the ramps at Broad Street and Mercer Street, reconfigure access to/from Aurora Avenue to the north of the Battery Street tunnel, and reconnect the street grid in certain areas.

~~Planning for the Mercer Street improvements is more advanced than planning for the other proposed improvements. However, funding has not been finalized for any of these improvements, nor have construction schedules been established.~~

~~The Mercer Street improvements call for the conversion of Mercer Street from one-way to two-way operations, with the provision of three travel lanes in each direction and additional turn lanes at intersections. If implemented along the northern boundary of the project site, Mercer Street would be widened, requiring up to 50 feet in additional setback from the existing roadway.~~

~~The Aurora Avenue North improvements would reconfigure access to/from Aurora Avenue to the north of the Battery Street tunnel.~~ The current proposal would lower Aurora Avenue North between Roy Street and Denny Way, and would reconnect several streets across Aurora Avenue, including Harrison Street, Thomas Street, and possibly Republican Street. In addition, the connections between Aurora Avenue North and the surface street network would be modified to provide additional/consolidate access points at Roy Street and possibly Republican Street. Currently included in the reconnection of the streets across Aurora Avenue is the reconnection of Sixth Avenue North between Roy Street and Harrison Street, through the proposed project site.

## 2.5 Development of Alternatives

The site is proposed for development as the office campus headquarters for the Bill & Melinda Gates Foundation. Development would occur in phases beginning in late 2007 with the first phase of approximately 420,000 – 600,000 square feet planned for occupancy in 2010. This would be the foundation's long-term headquarters with flexibility to develop over time.

Separately from the EIS, the project is undergoing design review by the Magnolia-Queen Anne Design Review Board (DRB). The project applicant and architects presented the project to the DRB on November 2, 2005 for early design guidance and again on January 18, 2006 and July 19, 2006. Notice of the DRB meetings was provided to the public through postings at the project site and an opportunity was provided during the DRB meetings for public comment on



the design. As a result of comments from the DRB and direction from the Bill & Melinda Gates Foundation, the project design has evolved from what was shown in the DEIS. The current designs for all alternatives (Alternatives 2a, 3a and 4a) are shown in Chapter 2 as Figures 2-2a, 2-3a and 2-4a. The total square footage at project build-out would not change, however the phasing might change. The Phase 1 development would likely increase from the approximately 420,000 square feet analyzed in the DEIS to approximately 600,000 square feet at opening day (approximately Year 2010).

The first phase of development would include office and meeting space and would be constructed in the northwest corner of the site near Fifth Avenue North and Mercer Street and in the central part of the campus (see Figures 2-2a, 2-3a and 2-4a). Primary access to the campus will be from Fifth Avenue North and Republican Street.

The foundation is designing an office campus to meet the following principles that have been identified by the applicant:

- For neighbors:
  - The development will fit with the size and scale of the surrounding neighborhood.
  - The design will be inspiring and creative, and fit within the neighborhood.
  - The campus will be secure, in a low profile way.
  - The edges of the campus will be well defined and landscaped.
  - The design will integrate sustainable materials and methods.
- For foundation workers:
  - The design must create a sense of place that reflects the foundation's work in health and learning.
  - The buildings will be connected in a campus-like setting designed to facilitate interaction, collaboration and learning.
  - The campus design will include green open spaces.
  - The design will provide access to natural light for all workers.

The design opportunities for the site are driven by the following considerations:

- Shape and size of the overall parcel
- Available vehicular access points
- New Seattle Center parking garage location east of Fifth Avenue North between Harrison and Republican Streets.

## **2.6 Alternative 1 — No Action**

For the purpose of establishing a baseline condition, a *No Action Alternative (Alternative 1)* is studied. The *No Action Alternative* would leave the existing site as is, unless and until another proposal is approved. The *No Action Alternative* is defined by the following assumptions:

- Existing 1,217 space surface parking lot remains as is
- Existing access to parking lot remains as is
- The new Seattle Center garage is complete and operational

- The Sonics facility remains as is and operational until September 30, 2010; after that time there would be a similar use in the building
- Roadways remain as is (no [improvements to Mercer Street between Fifth Avenue North and Dexter Avenue North](#), Aurora Avenue North, or Sixth Avenue North [improvements](#))
- No sidewalk improvements are made onsite
- Existing utilities remain as is, except for utilities affected by construction of the Seattle Center garage

## 2.7 ~~Alternative 2~~[Alternative 2a](#) — 1,000,000 Square Foot Development Without Sixth Avenue North Improvements

This alternative would provide a typical level of office campus development area, with standard width office buildings and surface parking, including minimum setbacks, **with no** improvements to Mercer Street, Aurora Avenue North or reconnection of Sixth Avenue North. See Figure 2-2 – *Alternative 2 – 1,000,000 Sq. Ft. Development without 6<sup>th</sup> Avenue Improvements*.

[Based on comments from the Design Review Board and direction from the Bill & Melinda Gates Foundation, the design for Alternative 2 has evolved from the rectangular building shapes depicted in the DEIS \(see Figure 2-2\) to a curved design \(see Figure 2-2a\). With the new design \(Alternative 2a\), there would be three buildings each of approximately 300,000 – 400,000 square feet for a total of 1,000,000 square feet. The first phase of construction would consist of two of the three planned buildings, a development of approximately 600,000 square feet. The final phase building, located on the eastern portion of the site, would be constructed after the Year 2010 expiration of the Seattle Sonics lease of their practice facility.](#)

- Building square feet
  - [Opening day \(approximately Year 2010\) of Approximately approximately 420,000 square feet ~~on opening day \(approximately Year 2010\)~~ with 450 parking spaces \(204 spaces constructed on-site and 246 spaces provided by covenant in the adjacent Seattle Center Garage\) , to approximately 600,000 square feet with 658 parking spaces \(412 spaces constructed on-site and 246 spaces provided by covenant in the adjacent Seattle Center Garage\)<sup>4</sup>](#)
  - Approximately 1,000,000 [square feet](#) at end of 15-year MPD (approximately Year 2025) with 1,226 parking spaces (980 spaces constructed on-site and 246 spaces provided by covenant in the adjacent Seattle Center Garage)
- Campus would maintain a secure environment for foundation workers and guests; there would be no public streets or public walkways through the project site
- New Seattle Center garage is complete and operational
- No improvements made to Mercer Street [between Fifth Avenue North and Dexter Avenue North](#), Aurora Avenue North , or Sixth Avenue North
- Sidewalk improvements constructed along Fifth Avenue North and Mercer Street
- Sonics facility closed in 2010; site redeveloped for campus use

<sup>4</sup> [In addition to the impact analysis for full build-out of 1,000,000 square feet, this EIS includes an impact analysis for both the lower and higher ends of the potential Phase I development for Year 2010. See Appendices A and E, and Section 3.1.](#)

- Affected utilities would be relocated

As with Alternatives 3a and 4a, ~~The~~ the building set backs ~~for Alternative 2a~~ would be approximately 30 feet from the existing ~~Mercer Street and~~ Fifth Avenue North ~~existing~~ curb lines, and approximately 80 feet from the existing Mercer Street curb line. Primary exterior materials would include the use of stone and clear glazing. Additional materials may include burnished metal panels and detailing. Glass selection would seek to emphasize low-reflective qualities and window wall systems will typically utilize aluminum mullions. Landscape material between the building and the street property line would further reduce any reflectivity. On-site parking would be provided for 204 ~~– 412~~ vehicles beneath the first phase buildings, with a total of 980 spaces with full campus build-out.

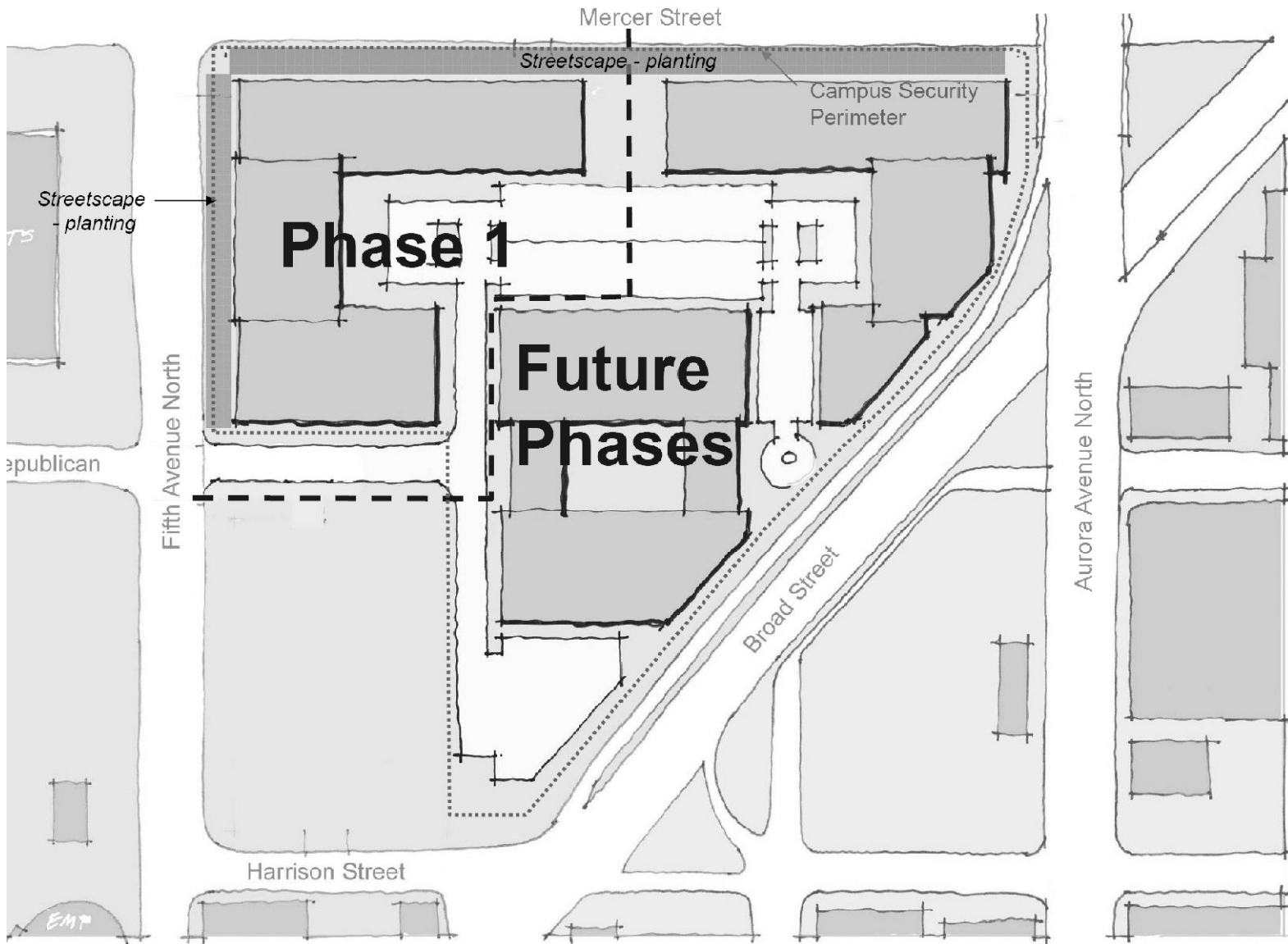


Figure 2-2  
**Alternative 2 – 1,000,000 Sq. Ft. Development Without 6th Avenue Improvements**

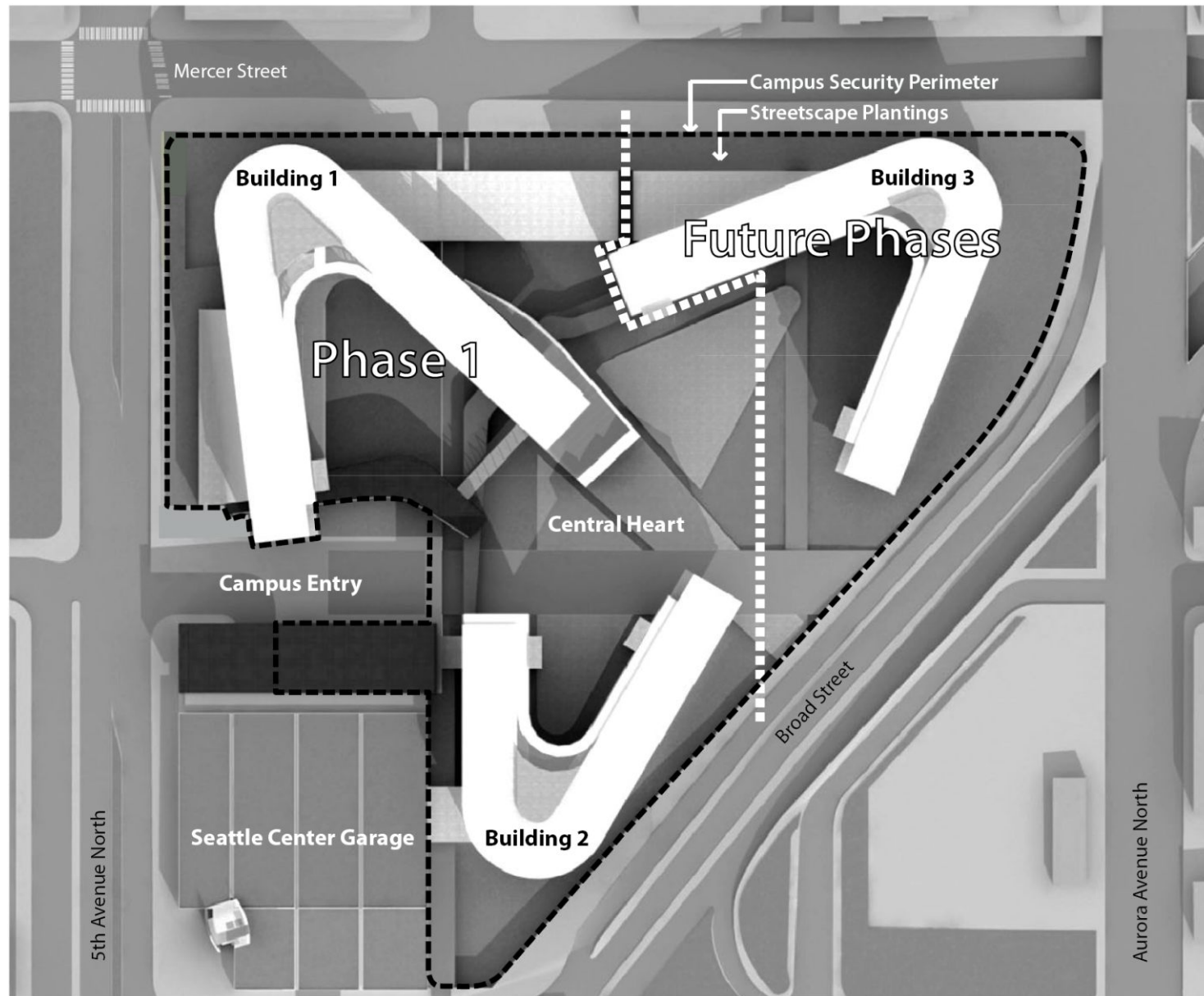


Figure 2-2a  
**Alternative 2a – 1,000,000 Sq. Ft. Development Without 6th Avenue Improvements – Revised Design**



## 2.8 Alternative 3a — 900,000 Square Foot Development Without Sixth Avenue North Improvements

This alternative would provide a less dense or intense level of development than *Alternative 2a* ~~with narrower buildings, more open space, and wider setbacks~~. This alternative would be designed to accommodate 900,000 square feet ~~with no~~ improvements to Mercer Street ~~between Fifth Avenue North and Dexter Avenue North~~, Aurora Avenue North or reconnection of Sixth Avenue North.

Based on comments from the Design Review Board and direction from the Bill & Melinda Gates Foundation, the design for Alternative 3 has evolved from the rectangular building shapes depicted in the DEIS (see Figure 2-3) to a curved design (see Figure 2-3a). With the new design, there would be three buildings each of approximately 300,000 square feet for a total of 900,000 square feet. The first phase of construction would consist of two of the three planned buildings, a development of approximately 600,000 square feet. The final phase building, located on the eastern portion of the site, would be constructed after the Year 2010 expiration of the Seattle Sonics lease of their practice facility.

- Building square feet
  - Opening day (approximately Year 2010) of Approximately approximately 420,000 square feet on opening day (approximately Year 2010) with 450 parking spaces (204 spaces constructed on-site and 246 spaces provided by covenant in the adjacent Seattle Center Garage), to approximately 600,000 square feet with 658 parking spaces (412 spaces constructed on-site and 246 spaces provided by covenant in the adjacent Seattle Center Garage)<sup>5</sup>
  - Approximately 900,000 square feet at end of 15-year MPD (approximately Year 2025) with 1,226 parking spaces (980 spaces constructed on-site and 246 spaces provided by covenant in the adjacent Seattle Center Garage)
- Campus would maintain a secure environment for foundation workers and guests; there would be no public streets or public walkways through the project site.
- New Seattle Center garage is complete and operational
- No improvements made to Mercer Street between Fifth Avenue North and Dexter Avenue North, Aurora Avenue North, or Sixth Avenue North
- Sidewalk improvements constructed along Fifth Avenue North and Mercer Street
- Sonics facility closed in 2010; site redeveloped for campus use
- Affected utilities would be relocated

As with *Alternatives 2a* and *4a*, the building set back will be approximately 30 feet from the existing Fifth Avenue North curb line, and, ~~similar to Alternative 4~~, approximately 80 feet from the existing Mercer Street curb line. The primary exterior materials would be the same as described for *Alternative 2a*. Landscape material between the building and the street property line will further reduce any reflectivity. On-site parking will be provided for 204 vehicles for a 420,000 square foot development, or 412 vehicles for a 600,000 square foot development, beneath the first phase buildings with a total of 980 spaces with full campus build-out.

<sup>5</sup> In addition to the impact analysis for full build-out of 900,000 square feet, this EIS includes an impact analysis for both the lower and higher ends of the potential Phase I development for Year 2010. See Appendices A and E, and Section 3.1.

See Figure 2-3 – *Alternative 3 – 900,000 Square Foot Development Without 6<sup>th</sup> Avenue Improvements*, [and Figure 2-3A – Alternative 3a – 900,000 Square Foot Development Without 6<sup>th</sup> Avenue Improvements - Revised Design](#).

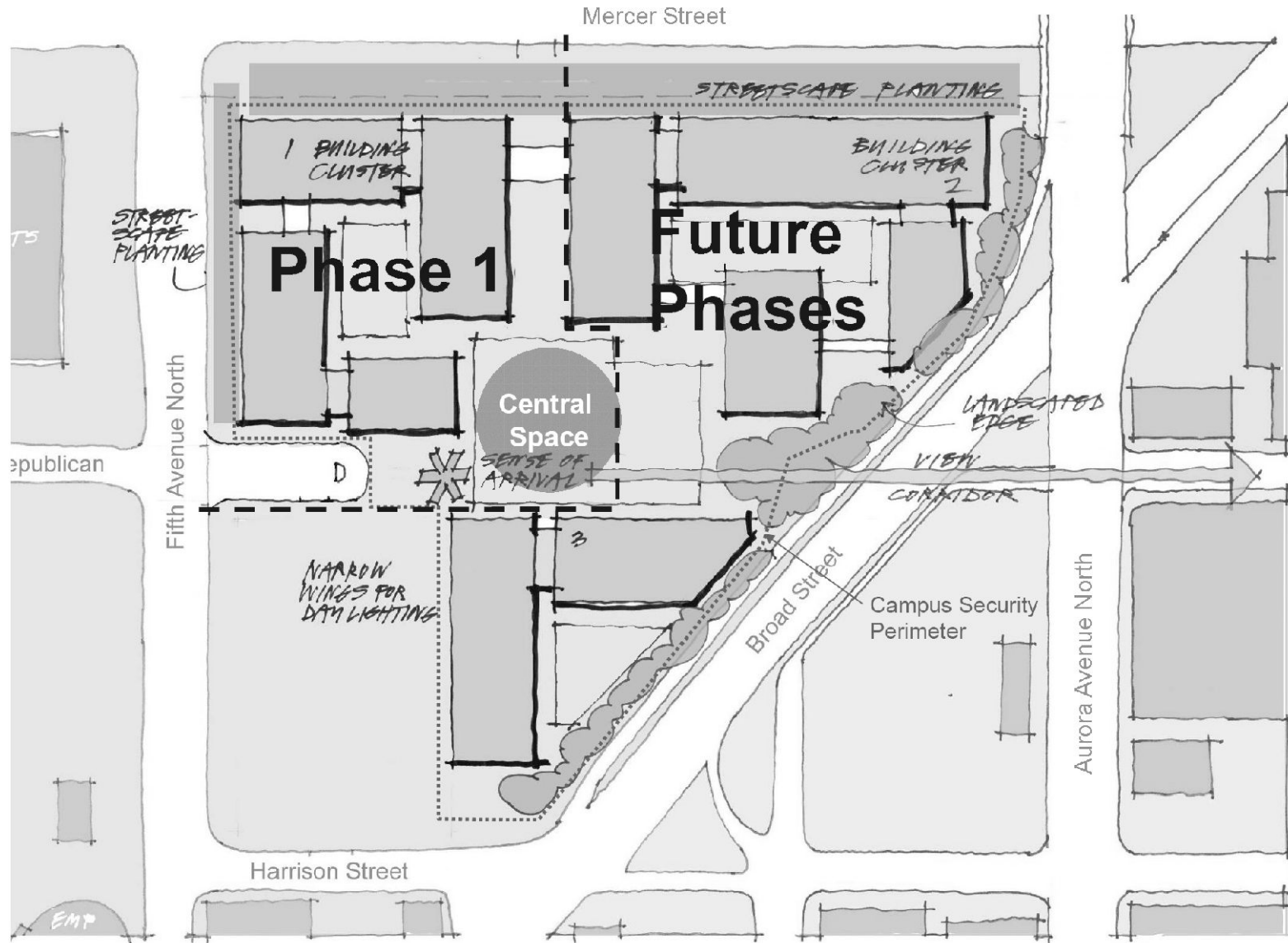


Figure 2-3  
**Alternative 3 – 900,000 Sq. Ft. Development Without 6th Avenue Improvements**

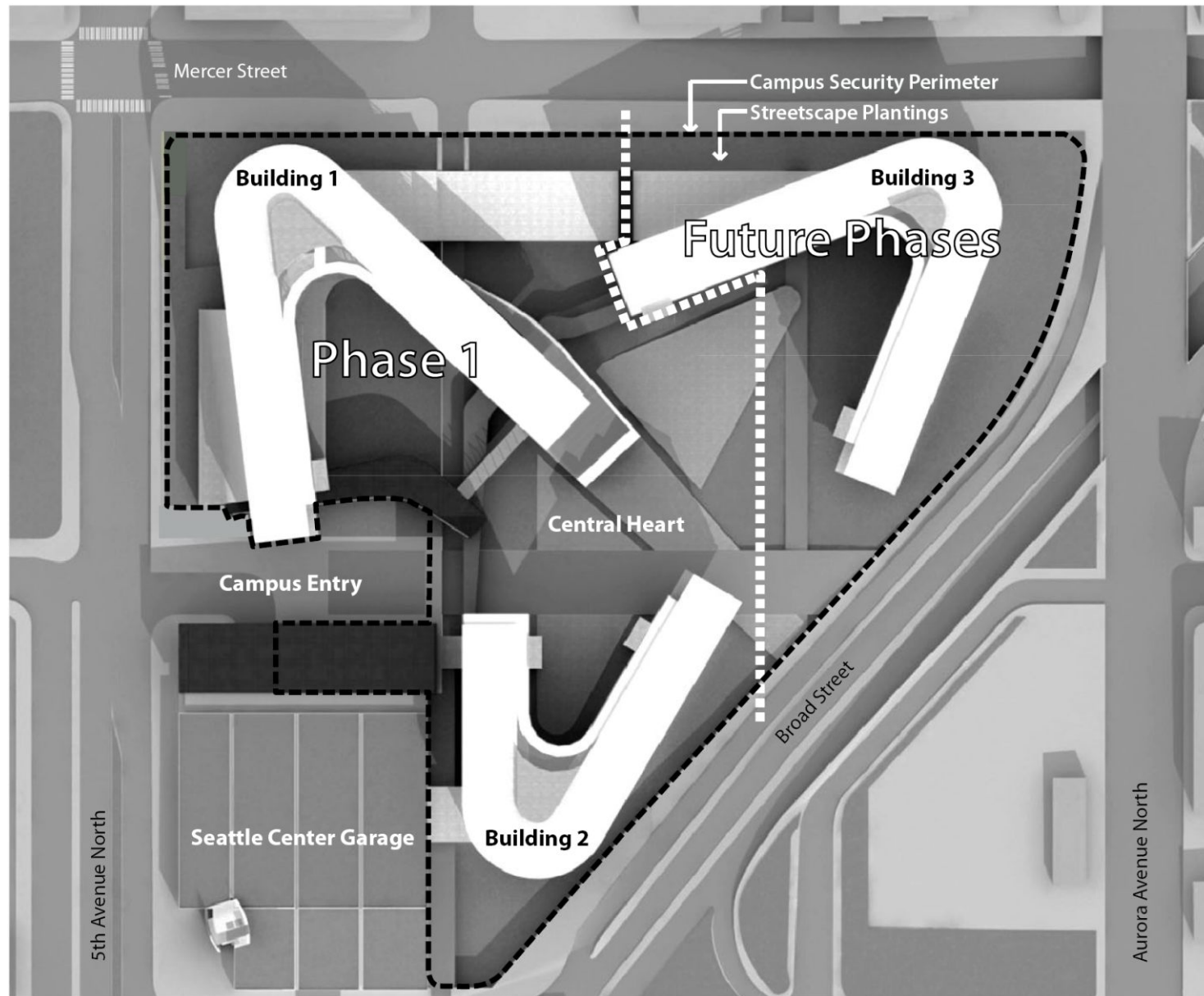


Figure 2-3a  
**Alternative 3a – 900,000 Sq. Ft. Development Without 6th Avenue Improvements – Revised Design**

## 2.9 Alternative 4a — 900,000 Square Foot Site Development With Sixth Avenue North Improvements

Like *Alternative 3a*, this alternative would provide a less dense or intense level of development than *Alternative 2a* ~~with narrower buildings, more open space, and wider setbacks~~. This alternative would be designed to accommodate 900,000 square feet with improvements to Mercer Street, Aurora Avenue North and a reconnection of Sixth Avenue North.

Similar to Alternatives 2a and 3a as described above in Sections 2.7 and 2.8, the design for Alternative 4 has evolved from the rectangular building shapes depicted in the DEIS (see Figure 2-4) to a curved design (see Figure 2-4a) based on comments from the Design Review Board and direction from the Bill & Melinda Gates Foundation. With the new design, there would be three buildings each of approximately 300,000 square feet for a total of 900,000 square feet. The first phase of construction would consist of two of the three planned buildings, a development of approximately 600,000 square feet. The final phase building, located on the eastern portion of the site, would be constructed after the Year 2010 expiration of the Seattle Sonics lease of their practice facility.

- Building square feet
  - Opening day (approximately Year 2010) of approximately 420,000 square feet on opening day (approximately Year 2010) with 450 parking spaces (204 spaces constructed on-site and 246 spaces provided by covenant in the adjacent Seattle Center Garage), to approximately 600,000 square feet with 658 parking spaces (412 spaces constructed on-site and 246 spaces provided by covenant in the adjacent Seattle Center Garage)<sup>6</sup>
  - Approximately 900,000 square feet at end of 15-year MPD (approximately Year 2025) with 1,226 parking spaces (980 spaces constructed on-site and 246 spaces provided by covenant in the adjacent Seattle Center Garage)
- Campus would maintain a secure environment for foundation workers and guests; there would be no public streets or public walkways through the project site
- New Seattle Center garage is complete and operational
- Roadway configuration includes proposed improvements to Sixth Avenue North, Mercer Street, and Aurora Avenue North
- Sidewalk improvements constructed along Fifth Avenue North and Mercer Street
- Sonics facility closed in 2010; site redeveloped for campus use
- Affected utilities would be relocated

As with *Alternatives 2a* and *3a*, the building set back will be approximately 30 feet from the existing Fifth Avenue North curb line, and, ~~similar to Alternative 3~~, approximately 80 feet from the existing Mercer Street curb line. The primary exterior materials would be the same as described for *Alternative 2a*. Landscape material between the building and the street property line will further reduce any reflectivity. On-site parking will be provided for 204 vehicles for a 420,000 square foot development, or 412 vehicles for a 600,000 square foot development, beneath the first phase buildings with a total of 980 spaces with full campus build-out.

<sup>6</sup> Ibid.

While funding has not been finalized for the proposed transportation improvements to Sixth Avenue North, Mercer Street [between Fifth Avenue North and Dexter Avenue North](#), and Aurora Avenue North, and no construction schedules have been established, if these projects move forward *Alternative 4* would allow for future phases of the campus to be configured along both sides of reconnected Sixth Avenue North. Figure 2-4 illustrates how a skybridge might connect facilities on either side of reconnected Sixth Avenue North<sup>7</sup>. [The revised design shown in Figure 2-4a illustrates how the revised design might connect facilities on either side of reconnected Sixth Avenue North.](#) See Figure 2-4 – *Alternative 4 – 900,000 Square Foot Development With 6th Avenue Improvements* [and Figure 2-4a – Alternative 4a – 900,000 Square Foot Development With 6th Avenue Improvements – Revised Design.](#)

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<sup>7</sup> If *Alternative 4* is selected for implementation, the proposed skybridge may require additional environmental review.



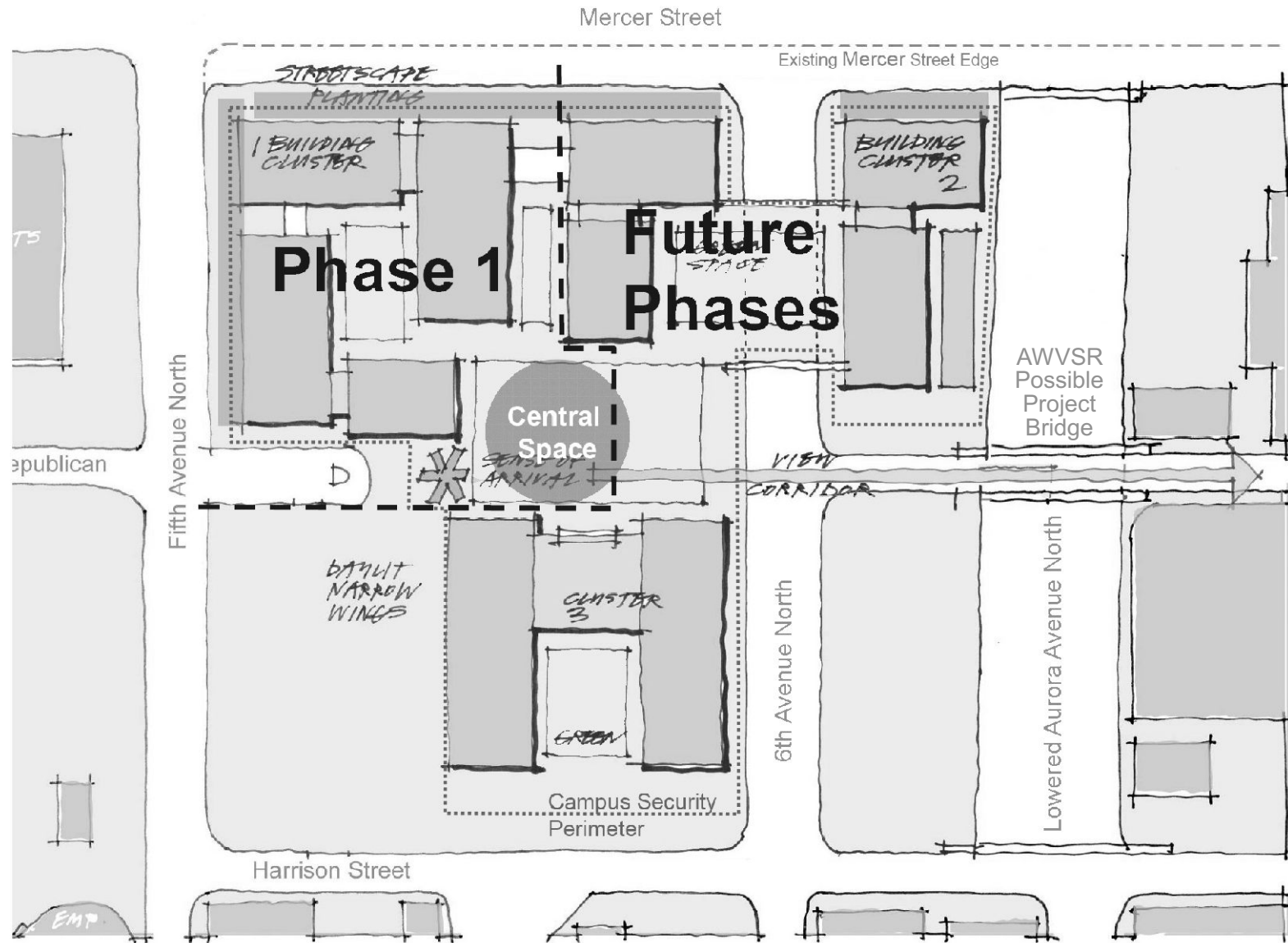


Figure 2-4  
**Alternative 4 – 900,000 Sq. Ft. Development With 6th Avenue Improvements**

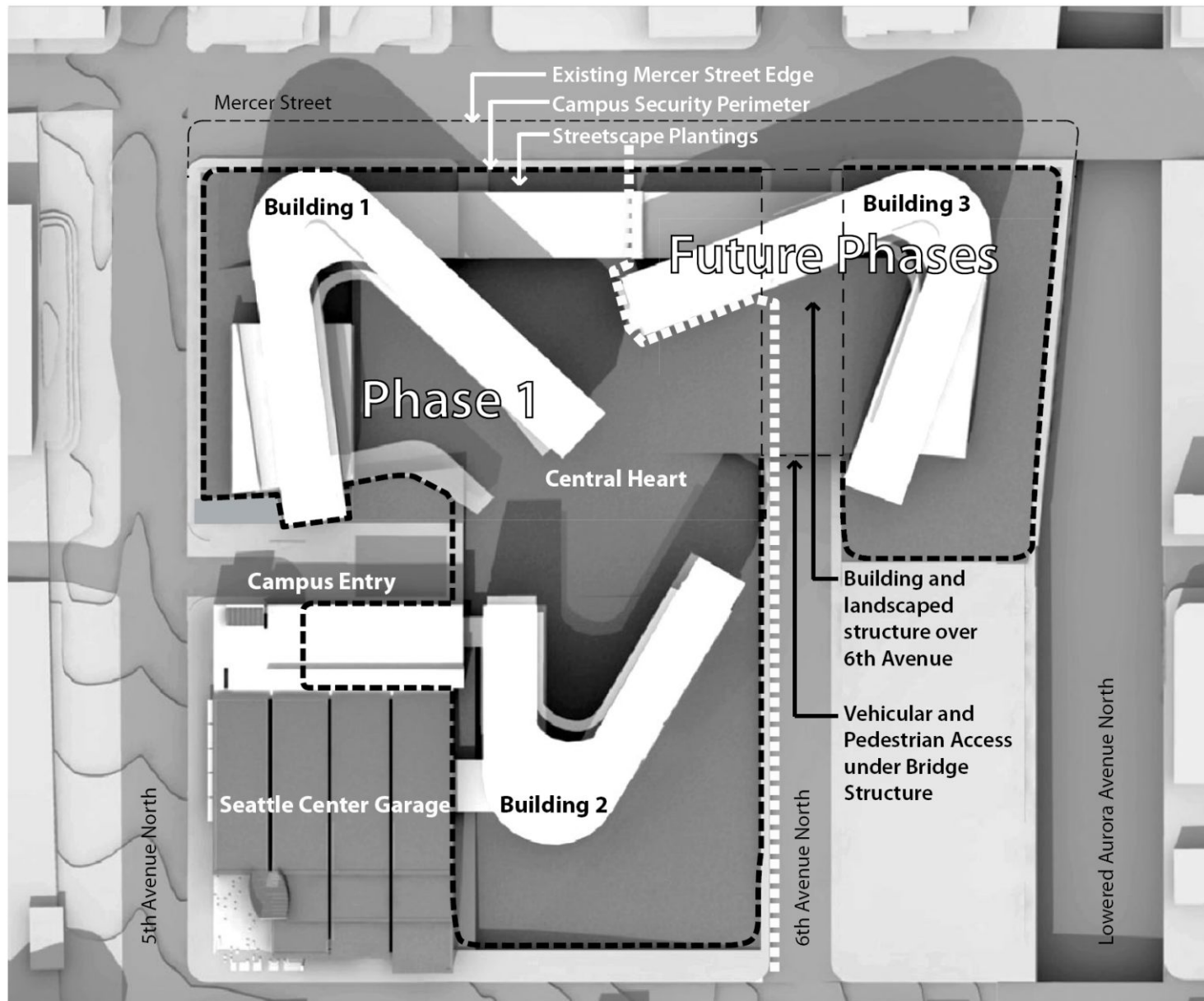


Figure 2-4a  
**Alternative 4a – 900,000 Sq. Ft. Development With 6th Avenue Improvements – Revised Design**



## **2.10 Visitor Learning Center and Retail**

With each action alternative, a visitor learning center and retail space may be constructed on the north end of the adjacent Seattle Center garage project. The purpose of the visitor learning center is for the public to learn about the Bill & Melinda Gates Foundation and its mission. The learning center would be approximately 26,000 square feet, including exhibit space open to the public and accessory office space. Consistent with other exhibit venues in Seattle, the visitor learning center is expected to be open to the public from 10 to 5 weekdays and 10 to 6 on weekends. If constructed, the retail space would be approximately 10,000 square feet and located along the Fifth Avenue North portion of the garage.

See Figure 2-5 *Proposed Location Visitor Learning Center and Retail Space*.

## **2.11 Benefits and Disadvantages of Delaying Project Implementation**

The benefits of deferring action on the proposal would include:

- Delaying construction impacts (primary benefit); however, the phased nature of this development proposal will postpone some of the construction impacts until later phases of the development.
- Allowing more certainty regarding potential improvements to surrounding roadways.

The disadvantages of deferring action on the proposed project would include:

- Forcing the applicant to find another site to address its need for a consolidated campus. The current office space is dispersed, which encumbers foundation activities and hampers communication between foundation staff.
- The loss of millions in revenues to the City for sale of the property.

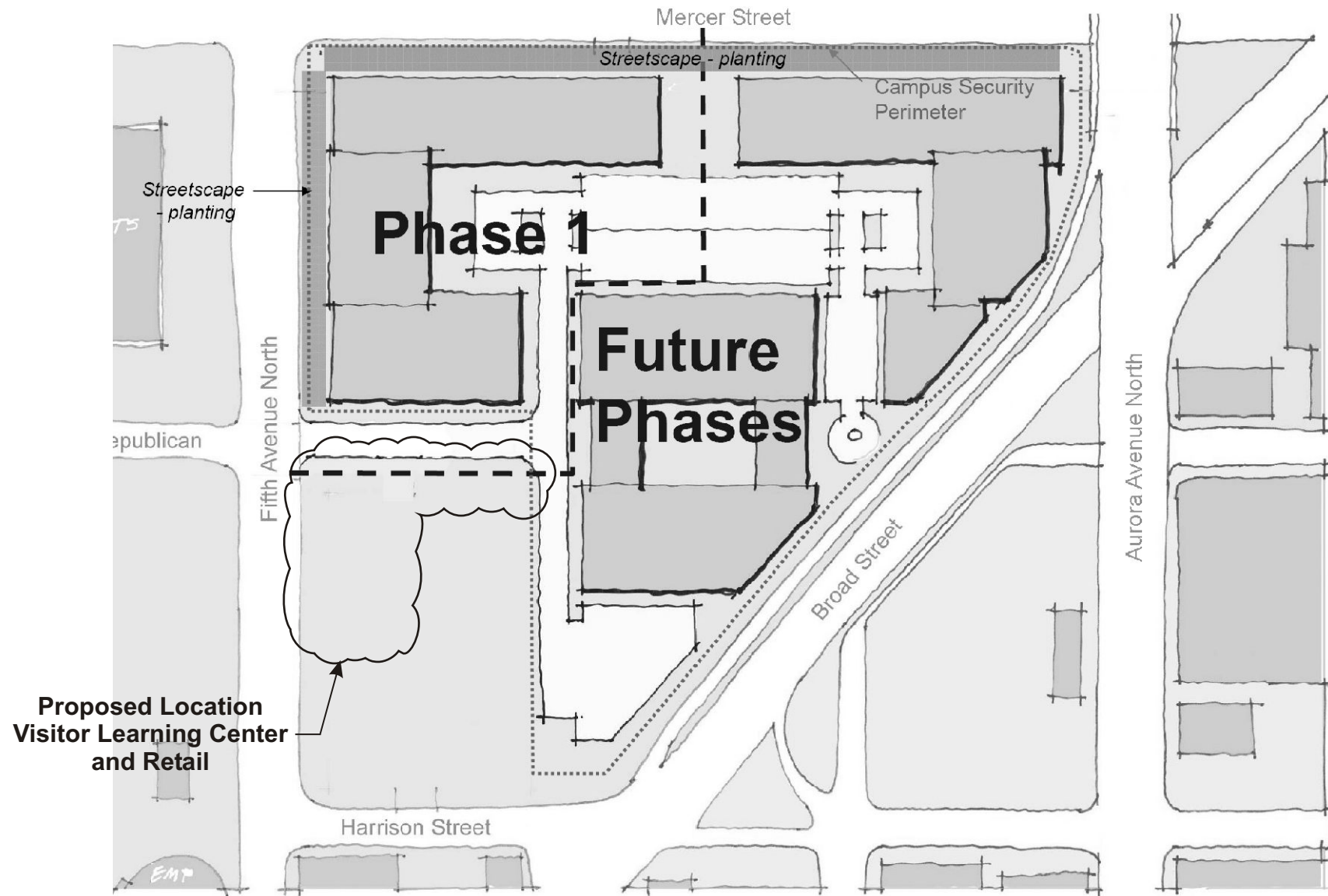


Figure 2-5  
**Proposed Location Visitor Learning Center and Retail Space**

### **3.0 Affected Environment, Environmental Impacts, Mitigating Measures and Significant Unavoidable Adverse Impacts**

DPD evaluated the project's potential adverse impacts on each elements of the environment. DPD determined that the project would have a potential significant adverse impact on transportation, and those impacts and potential mitigating measures are discussed below. Construction impacts (air quality, noise, and transportation) are also discussed. See Section 3.2 of this [DEIS/FEIS](#).

#### **3.1 Transportation**

This section provides a summary of the traffic impact analysis for the project, which is published in its entirety as Appendix A. [The traffic and transportation impact analysis considers both the opening in approximately Year 2010 and the full build-out by Year 2025. As described above in Chapters 1 and 2, the building designs for all alternatives \(Alternatives 2, 3 and 4\) has changed as a result of comments from the Design Review Board and from the Bill & Melinda Gates Foundation. With the new design, there would be three buildings each of approximately 300,000 – 400,000 square feet for a total of up to 1,000,000 square feet. The first phase of construction would consist of two of the three planned buildings, a development of approximately 600,000 square feet. The final phase building, located on the eastern portion of the site, would be constructed after the Year 2010 expiration of the Seattle Sonics lease of their practice facility.](#)

[While the site design plans shown in the DEIS reflected approximately 420,000 square feet of building area for the Phase 1 development opening in Year 2010, 450,000 square feet was used as the basis of the traffic analysis so that traffic impacts would not be underestimated. In order to assess and compare the traffic and transportation impacts of the revised designs, a new analysis has been prepared that evaluates an approximately 600,000 square foot Phase 1 development opening in Year 2010. This analysis is included in its entirety as Appendix E to this FEIS and summarized in the sections below.](#)

##### **3.1.1 Affected Environment**

The following section documents the existing transportation network and conditions in the vicinity of the proposed project, including the existing street system, traffic volumes, traffic operations, transit service and facilities, non-motorized facilities, current safety conditions, and parking conditions.

##### **Street System**

In general, the street system surrounding the site is a combination of one-way and two-way multi-lane streets, typically with on-street parking and sidewalks. The signalized study intersections are controlled with actuated traffic signals, many of which are coordinated with adjacent signals. At unsignalized study intersections, traffic on the minor approach is controlled with stop signs. The study area street system was determined in consultation with City review

staff, and extends from First Avenue North east to Fairview Avenue, and from Denny Way north to Roy Street. Detailed descriptions of the characteristics of streets that serve the traffic impact study area are contained in Appendix A.

### ***Existing Traffic Volumes***

Traffic volume data were compiled for the study area to characterize weekday traffic conditions during the AM and PM peak hours. The peak hours document traffic conditions during the hours of highest traffic volume and congestion in the site vicinity. Due to commute patterns and a number of streets in the area that are operated as one-way arterials, travel patterns differ between the AM and PM peak hours. Thus, the evaluation of these two time periods provides a complete perspective of peak hour operations within the study area. New traffic counts were conducted at all study intersections during 2005. Refer to Appendix A, Figure 3, which summarizes existing weekday AM and PM peak hour traffic volumes within the study area.

### ***Intersection Operations***

A level of service (LOS) analysis was conducted at each study intersection for the weekday AM and PM peak hours, using the methodologies presented in the *Highway Capacity Manual*<sup>8</sup>. LOS values range from LOS A, indicating good operating conditions with little or no delay, to LOS F, indicating extreme congestion and long vehicle delays. A more detailed explanation of LOS criteria is provided in Appendix A. Table 3.1-1 summarizes the existing AM and PM peak hour LOS at each study intersection. During the AM peak hour, all study intersections operate at LOS D or better, with the exception of the Fairview Avenue/Mercer Street intersection, which currently operates at LOS F. During the PM peak hour, all study intersections operate at LOS D or better with the exceptions of the Dexter Avenue/Mercer Street, Fairview Avenue/Mercer Street, Aurora Avenue/Denny Way, and Howell Street/Yale Avenue intersections which operate at LOS E.

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<sup>8</sup> Transportation Research Board, 2000.

**Table 3.1-1**  
**2005 Existing AM and PM Peak Hour LOS Summary**

#	Intersection	AM Peak Hour			PM Peak Hour		
		LOS <sup>1</sup>	Delay <sup>2</sup>	V/C <sup>3</sup> or WM <sup>4</sup>	LOS	Delay	V/C or WM
1	5 <sup>th</sup> Ave/Roy St	C	25.9	0.49	B	18.6	0.64
2	9 <sup>th</sup> Ave/Broad St	D	36.1	0.95	C	28.5	0.87
3	Westlake Ave/Valley St	B	11.2	0.51	B	17.4	0.94
4	Fairview Ave/Valley St	C	29.1	0.76	C	26.1	0.70
5	1 <sup>st</sup> Ave/Mercer St	B	13.5	0.45	B	17.9	0.60
6	5 <sup>th</sup> Ave/Mercer St	D	39.4	0.42	C	21.2	0.59
7	Dexter Ave/Mercer St	D	41.9	0.74	E	59.6	0.93
8	9 <sup>th</sup> Ave/Mercer St	B	19.7	0.71	C	33.3	0.72
9	Westlake Ave/Mercer St	A	8.1	0.62	B	19.8	0.75
10	Fairview Ave/Mercer St	F	87.3	1.07	E	68.9	1.14
11	5 <sup>th</sup> Ave/Republican St	A	8.8	0.16	A	3.7	0.30
12	5 <sup>th</sup> Ave/Harrison St	C	33.2	0.29	B	19.8	0.48
13	Broad St/Harrison St*	C	17.9	EB	C	17.3	EB
14	5 <sup>th</sup> Ave/Broad St	D	44.2	0.52	C	21.8	0.53
15	1 <sup>st</sup> Ave/Denny Way	B	12.2	0.75	B	14.0	0.71
16	Broad St/Denny Way	B	18.0	0.66	B	20.4	0.60
17	5 <sup>th</sup> Ave/Denny Way	B	13.3	0.53	B	15.6	0.56
18	Aurora Ave/Denny Way	C	27.8	0.75	E	64.4	0.83
19	Dexter Ave/Denny Way	B	14.0	0.51	B	15.1	0.64
20	Westlake Ave/Denny Way	A	7.1	0.51	B	13.4	0.60
21	Fairview Ave/Denny Way	C	28.5	0.63	D	36.6	0.69
22	Stewart St/Denny Way	D	45.2	0.99	C	30.8	0.84
23	Stewart St/Yale Ave	A	4.5	- <sup>5</sup>	B	13.6	- <sup>5</sup>
24	Howell St/Yale Ave	D	48.1	0.91	E	68.9	1.09

1. Level of service, based on 2000 HCM methodology.

2. Average delay per vehicle, in seconds.

3. V/C = Volume-to-capacity ratio for signalized intersections.

4. WM = worst movement or approach for unsignalized intersections.

5. Intersection runs on controller at Stewart/Denny; resulting v/c ratio not applicable to this intersection.

\* Unsignalized intersection.

### **Traffic Safety**

An analysis of historical accident data was conducted at the study intersections, as well as the roadway segments near the project site. Data were obtained from the City of Seattle for the full three years between January 2002 and December 2004, the most recent time period for which data were available. A summary of the total number and average annual accidents at each study intersection and roadway segment is provided in Appendix A.

Based on the historical accident data, three study intersections meet the City's criteria for a High Accident Location, defined as signalized intersections exceeding an average of 10 occurrences annually. The intersections of Fifth Avenue/Mercer Street had an average accident rate of 11.0 per year; Ninth Avenue/Mercer Street and Westlake Avenue/Denny Way both had an average accident rate of 10.7 per year.

### ***Transit Service***

King County Metro operates bus routes close to the project site. Sound Transit's Regional Express bus service does not currently serve the area. The majority of existing routes operate during the weekday AM and PM peak, midday, and evening periods, as well as on weekends. Service headways range from 10 to 60 minutes during the weekday peak hours, and 10 to 120 minutes during the weekday off-peak periods and on weekends. The existing transit service provides local access to the majority of the neighborhoods in the City of Seattle, and regional access to many cities within Puget Sound.

A number of transit stops are located within close proximity of the site. The nearest stops are located north and south of the site on Fifth Avenue North and along Aurora Avenue North. These stops serve Routes 3N, 4N, 5, 16, 26, 28, 82, and 358, providing service to Downtown Seattle, Rainier Beach, University District, Northgate, Lake City, Shoreline, White Center and other local and regional locations. From these stops, transit service can be taken to destinations throughout the region. South of the site on Broad St., Routes 3S, 4S, and 74 are served by a westbound stop near Fifth Avenue North.

The Seattle Center Monorail, the nation's first full-scale commercial monorail system, provides additional transit service adjacent to the project site.<sup>9</sup> Service is provided along an approximately one mile long route, connecting the Seattle Center with Westlake Center Mall, at Fifth Avenue/Pine Street, to the south. Typically daily service is provided with a single train traveling between the stations. Service is provided from 7:30 a.m. to 11:00 p.m. on weekdays, and from 9:00 am to 11:00 pm on weekends. The Monorail departs every 10 minutes from each station, with each trip taking approximately two minutes to complete. Each train can carry up to 450 passengers per trip. The Monorail provides two-train service during special events and activities, with departures every five minutes or less.

### ***Non-Motorized Facilities***

Walking and biking are important elements of the transportation system adjacent to the project site, especially as they relate to mode choice and the effort to reduce vehicular travel, and due to the proximity to the Seattle Center.

Seattle Center is home to numerous venues, including Pacific Science Center, EMP, and Key Arena. Entertainment is provided year-round, with an annual attendance of more than 10 million visitors to the community festivals, sporting events, concerts, cultural programs, theater performances, conventions and trade shows, and other events. Events range in size from small groups holding meetings and private parties to large events such as Sonics games, music events at Key Arena, and summer festivals. Typically, events are scheduled on the weekends or evenings, with some occurring concurrently. However, at times when the Sonics are playing, or during the weekend festivals, the use of the other facilities may be limited. The Sonics schedule typically includes approximately 45 home games between October and April. Combined with other major events at Key Arena (music concerts, and other sporting events), and at other venues in Seattle Center, this equates to approximately two major events per week,

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<sup>9</sup> During late 2005 and early 2006, the Monorail has been temporarily out of service pending repairs. It is expected that the Monorail will be repaired and back in service by Fall of 2006.

but may result in as many as four during a single week depending on schedule. Attendance at Sonics games averages 15,000, with a maximum capacity of 17,000. In addition, large Center-wide festivals occur several times during the summer, typically during holiday weekends. These events occur over several days and utilize the entire Center rather than individual facilities, and include Bumbershoot, Folklife, Bite of Seattle and others. Attendance at these festivals reaches over 100,000 spread out over several days.

The Seattle Center is located to the west of Fifth Avenue North. Fifth Avenue North separates the Seattle Center from the approximately 1,217 stall Seattle Center surface parking lot located to the east of Fifth Avenue North. Due to the parking lot location, pedestrian crossings of Fifth Avenue North between Harrison Street and Mercer Street are higher than at other locations along the Fifth Avenue corridor. This is especially true at times before and after events at Key Arena which have a specific start and end time, and during the summer weekend festivals which tend to generate continuous pedestrian traffic throughout the day. The following describes the existing pedestrian and bicycle facilities in the immediate area of the project site.

#### **Pedestrian Facilities**

Pedestrian facilities consist primarily of 5- to 8-foot-wide sidewalks along both sides of the streets within the study area. Each of the signalized study intersections includes pedestrian crosswalks, push buttons, and signal heads to facilitate pedestrian travel. [Aurora Avenue North \(SR 99\), on the east border of the project site, is a major barrier to pedestrian travel.](#)

#### **Bicycle Facilities**

Based on the *Seattle Bicycling Guide Map* (published by SDOT) there are dedicated bicycle lanes along Dexter Avenue North. With the exception of Dexter Avenue North, bicyclists typically use the vehicle travel lanes for travel in this area. [Aurora Avenue North \(SR 99\), on the east border of the project site, is a major barrier to bicycle travel.](#)

#### ***Parking***

##### **Parking Supply**

The project site currently includes approximately 1,217 spaces in the surface parking lot serving the Seattle Center and Seattle Sonics practice facility. Approximately eight on-street parallel parking stalls are available on the south side of Harrison Street between Fifth Avenue North and Broad Street; these are generally used by nearby businesses.

The Seattle Center has the following parking requirements:

**Table 3.1-2  
Seattle Center Stall Requirements by Facility**

Facility	Parking Requirement	Facility	Parking Requirement
Mercer Arena	33	Fun Forest Restaurant	6
New Seattle Center Pavilion	163	Fun Forest Shop	2
ATM Kiosks		Fun Forest Pavilion	35
Bagley Wright Theater	107	Fun Forest Game Line	9
Bagley Wright – Second Stage	46	Fun Forest Gift Shop	3
Bagley Wright Poncho Forum	17	KCTS Studios	30
Blue Spruce Building	9	Monorail Offices	4
Center House Armory		Northwest Rooms	307
– sub-basement	3	Northwest Craft Center	4
– basement	12	McCaw Hall	369
– First Floor office/retail	12	McCaw Hall Lecture Hall	40
–Children’s Museum	88	New Central Plant	5
–Group Theater	41	Seattle Center Shops	9
–Food Court Level	269	Intiman Playhouse	53
–Balcony Level	26	Pottery Northwest	3
–Conference Center	0	Seattle Children’s Theater	140
– Fourth Floor	46	Sonics Practice Facility	64
New Seattle Center Coliseum	1719	Space Needle 100 Level	13
Experience Music Project	200	Warehouse	18
EMP New Exhibit Space	84	Westcourt Building	11
Exhibition Hall	400	Center House Restaurant Dining Terrace	5
Phelps Center	32.5	Fisher Pavilion	147
		<b>Subtotal</b>	<b>4581</b>
		<b>New Fifth Avenue Garage<sup>10</sup></b>	
		Parking Office	5
		Customer Service Center	30
		<b>TOTAL STALLS REQUIRED</b>	<b>4616</b>
		Title 23 Coop. Parking Reduction (20%)	–923
		Subtotal	3693
		Title 23 Transit Reduction (20%)	–739
		<b>TOTAL TITLE 23 REQUIRED PARKING</b>	<b>2954</b>

<sup>10</sup> Seattle Center parking stall requirements as shown on the Master Use Permit Application for the new Fifth Avenue Garage.



With the new Fifth Avenue Parking Garage, the Seattle Center will have the following parking supply:

**Table 3.1-3  
Seattle Center Parking Supply**

<b>Parking Area</b>	<b>Number of Spaces</b>
Mercer Street Garage	1439
Fifth Avenue Garage	1038
First Avenue North Garage	654
New Lot #6 (west of Intiman Theater)	22
South Coliseum Lot	70
North of Bagley Wright	25
Adjacent to South Side of Opera House	2
North of Center House	2
KCTS Parking	4
Sonics Practice Facility	48
Westcourt Building (Sonics Team Shop)	10
<b>TOTAL PARKING SUPPLY</b>	<b>3314</b>
Total Title 23 Required Parking	2954
<b>Surplus Code Required Parking</b>	<b>360</b>

As shown above in Table 3.1-2, the Seattle Center has a parking requirement of 2954 spaces. With the new Fifth Avenue Garage, the Seattle Center will have a parking supply of 3314 spaces; an excess over Title 23 code required parking of 360 spaces.

### **Parking Demand**

Use of the existing surface parking lot varies according to the demand generated by events occurring at Seattle Center. On typical weekdays, with only minor events scheduled, the parking lot is underutilized with as few as 15 percent (approximately 190 spaces) of the available stalls occupied. When this is the case, the southwest portion of the parking lot experiences 100 percent utilization, while the areas to the north and east remain unused. This can be attributed to the proximity of the southwest parking stalls to the main pedestrian access to the Seattle Center.

At times when major events are scheduled for the Seattle Center venues, the entire parking lot can achieve close to 100 percent utilization. Major weekday events typically occur during the evening, and include Seattle Supersonics home games, music concerts in Key Arena, and other events. Typically, these major weekday events occur in individual venues and are scheduled so as not to occur concurrently. Weekday evening events which would generate high parking utilization typically occur between once and twice per weekend depending on the time of year (i.e. during the NBA season), but may result in as many as four during a week depending on schedule. During 2004, parking utilization data showed that the surface parking lot achieved 100 percent utilization on two weekdays. (See Table 3.1-4). Weekday evening events typically have a scheduled start and end time resulting in the majority of vehicles entering the parking lot during a short time period in advance of the event, and leaving the parking lot during the period immediately following the end of the event.

Major weekend events occur several time during the summer, typically during holiday weekends. These events occur over several days and utilize the entire Center rather than individual facilities, and include Bumbershoot, Folklife, Bite of Seattle and others. During 2004, parking utilization data showed that the surface parking lot achieved 100 percent utilization during 15 weekend days. Weekend events, which occur throughout the day, have higher daily attendances, although typically experience less pronounced peaks in arrivals or departures.

Table 3.1-4 provides a summary of the utilization of the existing Fifth Avenue North surface parking lots for November 17, 2003 through December 2, 2004. The data for this lot and other Seattle Center parking facilities are included as Appendix B.

**Table 3.1-4**  
**Fifth Avenue North Surface Lot Parking Utilization**

Percentge Full	Total Number of Times Annually	Number of Times of Occurrence by Weekend, Evenings or Weekdays			Weekday Usage	
		Weekends	Weekday Evenings	Weekdays	Weekday Spaces Used	Weekday Spaces Free
100	17	15	0	2	1217	0
90 to 99	16	12	2	2	1156	61
85	8	5	3	0	0	1217
80	7	4	3	0	0	1217
75	9	3	5	1	913	304
70	3	2	1	0	0	1217
65	19	11	7	1	791	426
60	15	11	3	1	730	487
55	20	14	3	3	669	548
50	31	16	3	12	609	609
45	20	14	2	4	548	669
40	41	23	4	14	487	730
35	47	19	9	19	426	791
30	37	10	5	22	365	852
25	48	17	5	26	304	913
20	64	16	14	34	243	974
11 to 19	55	14	7	34	183	1034
10	52	8	18	26	122	1095
under 10	30	6	9	15	61	1156

In addition to Seattle Center parking, the Seattle School District owns and operates a surface parking lot on the west side of Fifth Avenue North, north of Republican Street. The Memorial Stadium lot includes 268 parking stalls. Observations made by The Transpo Group (Transpo) in 2006 on a Tuesday morning (a rainy day in March) showed that a minimum of 220 were available. Transpo's multiple observations showed that between 15 and 20 percent of the available stalls were being utilized. It is likely that at other times of the year, especially during the summer and the holiday season, that the Memorial Stadium lot would be more highly

utilized. However, even assuming that double or triple the number of spaces are utilized during a typical weekday, more than 100 stalls would be available in the Memorial Stadium lot.

### **3.1.2 Impacts of the 2010 Initial Phase Project Alternatives**

This section describes the expected traffic and parking conditions within the study area for each of the project alternatives. The impacts associated with the initial phase project alternatives are evaluated for a horizon year of 2010 with a first phase development of approximately 420,000 square feet. [Impacts associated with an initial phase development of approximately 600,000 square feet are detailed in Appendix E and summarized below. The changes relate primarily to intersection level of service and parking.](#)

#### **Alternative 1 Initial Phase (No Action)**

This section describes expected traffic and parking conditions within the study area if no new development were to occur on the project site. The *Alternative 1 (No Action)* initial phase assumes that the existing land uses; structures, parking, and driveways would remain and provides a baseline for comparing each of the development alternatives. The traffic, circulation, and parking analysis for the *Alternative 1 (No Action)* initial phase was conducted for AM and PM peak hour conditions in the year 2010, consistent with the year of potential build-out of the *Alternatives 2, 3, and 4* initial phase.

#### ***Planned Improvements***

Planned transportation improvements within the study area are categorized into Roadway, Transit and Rail, and Non-Motorized Improvements.

#### **South Lake Union Transportation Plan**

The City of Seattle has developed a plan for improving transportation of all modes in South Lake Union. The plan is based on the South Lake Union Transportation Study. The plan was conceived with broad support from a diverse group of neighborhood, business and community representatives. The goals of the plan are to reconnect a growing neighborhood to the City, untangle streets that create barriers in the middle of Seattle, improve mobility for people in Queen Anne, Capitol Hill, Eastlake and surrounding neighborhoods that use this corridor, promote transit, walking, and biking, and enhance a smooth flow of freight and people through the corridor. Specific plan elements are described in more detail in Appendix A. Specific details are still under review and refinement by the City. The plan was developed with an understanding of the difference between existing deficiency and deficiency attributable to growth, both from within and outside the boundaries of the South Lake Union study area. The City has required developments both inside and outside the South Lake Union boundary to contribute to funding the plan based on the calculated pro-rata traffic impacts of the proposed project development.

#### **Roadway Improvements**

The City of Seattle *2005–2010 Adopted Capital Investment Program* (CIP) was reviewed to identify transportation improvement projects planned for the study area. The following projects were identified from the CIP list:

- **Mercer Corridor Project.** The City's CIP identifies this project to improve transportation facilities in the South Lake Union Mercer Corridor. The project's [EIS Environmental Assessment \(EA\)](#) is currently evaluating ~~several design~~ options, ~~including for~~ widening Mercer Street and converting it to two-way operations.
- **South Lake Union Streetcar.** This project, which is expected to be operational by late 2007, includes construction of a modern streetcar line between Downtown Seattle, South Lake Union Park and Fred Hutchison, circulating on Westlake and Terry Avenues.

### **Rail and Transit Improvements**

The Downtown Seattle Transit Tunnel is being converted from use by buses to also accommodate light rail as part of the Sound Transit system. Construction of rail lines in the tunnel required closure of the Transit Tunnel in September 2005 for a period of approximately two years. The tunnel is anticipated to reopen to bus service during Fall 2007, with light rail service in the tunnel anticipated to begin during 2009.

### **Non-Motorized Improvements**

No non-motorized facility improvements are currently identified in the City's CIP,

### **Developer Improvements**

In addition to the transportation projects identified above, improvements identified to mitigate the impacts of the planned development projects identified in the following section were included in the analysis of the *Alternative 1 (No Action)* initial phase. Three intersection improvement projects have been identified, one proposed to mitigate impacts of the proposed UW Medicine project, the second as part of the proposed 2201 Westlake development, and the third as part of the proposed Seattle Center garage.

The improvement proposed for the UW Medicine project would remove parking from the eastbound approach to the intersection of Westlake Avenue/Republican Street to provide a separate left-turn lane. The improvement proposed for 2201 Westlake would prohibit the northbound left-turn movement at the Westlake Avenue/Denny Way intersection. The improvement proposed for the Seattle Center garage would implement east/west split phasing at the Fifth Avenue/Harrison Street intersection, while prohibiting westbound right-turns on red, and providing east/west pedestrian connectivity across the north leg during the eastbound vehicle phase.

### **Traffic Volumes**

The 2010 AM and PM peak hour traffic volumes used in the analysis of the *Alternative 1 (No Action)* initial phase are comprised of existing traffic, background traffic growth, and traffic generated from specific planned developments anticipated to be occupied by the year 2010. An annually compounded growth rate of 0.5 percent was applied to existing (year 2005) peak hour volumes to account for general traffic growth in the study area projected by the year 2010. In addition, AM and PM peak hour traffic generated by planned development projects, also called "pipeline projects" were identified within the general vicinity. For this analysis, 22 pipeline projects were added to the 2010 traffic conditions. A list of the included pipeline projects is included in Appendix A. Refer to Appendix A, Figure 5, which summarizes the traffic

volumes that would occur during the AM and PM peak hour periods for *Alternative 1*.

### ***Traffic Operations***

Weekday peak hour intersection levels of service (LOS) were calculated for each of the study intersections for the *Alternative 1 (No Action)* initial phase. Adjustments were made to the traffic operations analysis to reflect the proposed changes to the local street system to account for the construction of the proposed South Lake Union Streetcar project. In addition, at study intersections with actuated signals, the green times were re-optimized based on year 2010 weekday AM and PM peak hour traffic volumes. A summary of the *Alternative 1 (No Action)* initial phase intersection operations are provided in Tables 3.1-7 and 3.1-8 later in this section.

2010 intersection levels of service within the study area are expected to change at a number of study intersections between Existing and 2010 *Alternative 1 (No Action)* initial phase conditions. At thirteen study intersections the LOS is expected to degrade between the Existing and *Alternative 1 (No Action)* initial phase conditions:

- Fifth Ave./Roy St. – LOS B to LOS C (PM Peak Hour)
- Ninth Ave./Mercer St. – LOS B to LOS C (AM Peak Hour)
- Westlake Ave./Mercer St. – LOS A to LOS C (AM Peak Hour), and LOS B to LOS F (PM Peak Hour)
- Broad St./Denny Way – LOS B to LOS C (AM and PM Peak Hours)
- Aurora Ave./Denny Way – LOS C to LOS D (AM Peak Hour), and LOS E to LOS F (PM Peak Hour)
- Stewart St./Denny Way – LOS D to LOS F (AM Peak Hour), and LOS C to LOS D (PM Peak Hour)
- Fairview Ave./Denny Way – LOS D to LOS E (PM Peak Hour)
- Howell St./Yale Ave. – LOS D to LOS E (AM Peak Hour), and LOS E to LOS F (PM Peak Hour)
- Westlake Ave./Valley St. – LOS B to LOS D (PM Peak Hour)
- Fairview Ave./Mercer St. – LOS E to LOS F (PM Peak Hour)
- Fifth Ave./Harrison St. – LOS B to LOS C (PM Peak Hour)
- Westlake Ave./Denny Way – LOS B to LOS C (PM Peak Hour)
- Mercer St./Fairview Ave. – LOS E to LOS F (PM Peak Hour)

Additionally, the LOS at Mercer Street/Dexter Avenue (LOS E in PM Peak Hour) and Mercer Street/Fairview Avenue (LOS F in AM Peak Hour) will continue to operate poorly.

### ***Transit & Rail***

Transit operations in the study area are not expected to change as a result of the closure of the Transit Tunnel (September 2005). This shift from tunnel to surface street operations has not changed the overall degree of transit accessibility for the site vicinity. The number of routes and the frequency of routes traveling through downtown and near the project site are expected to be similar to current conditions.

Bus service is anticipated to return to the Transit Tunnel during Fall 2007 with light rail service

in the tunnel anticipated to begin during 2009. In addition, while bus transit headways are expected to be increased, overall transit service headways are expected to be reduced through downtown since rail service will attract a portion of transit ridership.

It is not anticipated that any changes are likely to be made to the existing Seattle Center Monorail which would result in operations being significantly different than those documented above for existing conditions. As stated in the *Planned Improvements* portion of this section, the South Lake Union Streetcar is anticipated to be complete by late 2007, and would improve transit connectivity through the study area. This is anticipated to increase transit travel within the study area compared to 2005 existing levels.

### ***Non-Motorized Facilities***

As stated in the *Planned Improvements* portion of this section, no changes to the non-motorized facilities within the study area are anticipated by 2010. While non-motorized travel is anticipated to increase within the study area compared to 2005 existing levels, existing non-motorized facilities are anticipated to accommodate anticipated growth.

### ***Safety***

There would be an increase in the potential for traffic accidents at the study intersections proportionate to the increase in traffic due to background and pipeline traffic growth that would occur by 2010. Therefore, it is possible that the proportionate increase in traffic at the intersections of Fifth Avenue/Mercer Street, Ninth Avenue/Mercer Street, and Westlake Avenue/Denny Way may impact the existing already high accident frequency at these locations.

### ***Parking***

With *Alternative 1 (No Action)*, parking supply in the project vicinity and on the project site would increase relative to the existing conditions documented in the *Affected Environment* portion of this section. No changes to on-street parking supply are identified by SDOT in the site vicinity. The *Alternative 1 (No Action)* initial phase would maintain current on-site parking supply for the existing uses. In addition, the proposed 1,038 stall Seattle Center Parking Garage is anticipated to be complete by 2010.

### **Alternative 2a Initial Phase**

This section documents traffic conditions within the study area if development were to occur according to the initial phase of *Alternative 2a*.

### ***Street System***

The planned transportation improvements described above for *Alternative 1 (No Action)* would occur. No off-site modifications to street channelization or intersection control are proposed as part of *Alternative 2a* initial phase. Development associated with *Alternative 2a* initial phase would improve existing sidewalks on the site frontage along Mercer Street, Harrison Street and Fifth Avenue North.

### Traffic Generation

Site-generated traffic volumes were developed using techniques accepted for other Seattle area traffic analyses, and reviewed in advance by City staff. They are described in detail in Appendix A, but include the primary steps of determining: how many trips will be generated; what travel modes will be used; where the traffic will come from and where will it go upon leaving the project site; and which routes will be used.

The following baseline mode-split values represent unmitigated values prior to implementation of a Transportation Management Program (TMP):

**Table 3.1-5  
Unmitigated Mode-Split Values**

Travel Mode	Percentage
Transit/Bike/Walk	10%
Carpool/Vanpool	10%
Single-Occupancy Vehicle	80%

As shown in Table 3.1-6, the *Alternative 2a* initial phase would generate approximately 3,635 ~~4,850~~ daily trips, and between 640 and ~~680~~ 910 peak hour trips.

**Table 3.1-6  
2010 Initial Phase Net New Trip Generation – Alternative 2a**

Time Period	Square Footage	Daily	AM Peak Hour			PM Peak Hour		
			In	Out	Total	In	Out	Total
Initial Phase Alternative <del>2a</del>	<u>450,000</u>	3,635	635	45	680	65	575	640
<u>Expanded Phase 1</u>	<u>600,000</u>	<u>4,850</u>	<u>845</u>	<u>65</u>	<u>910</u>	<u>85</u>	<u>770</u>	<u>855</u>

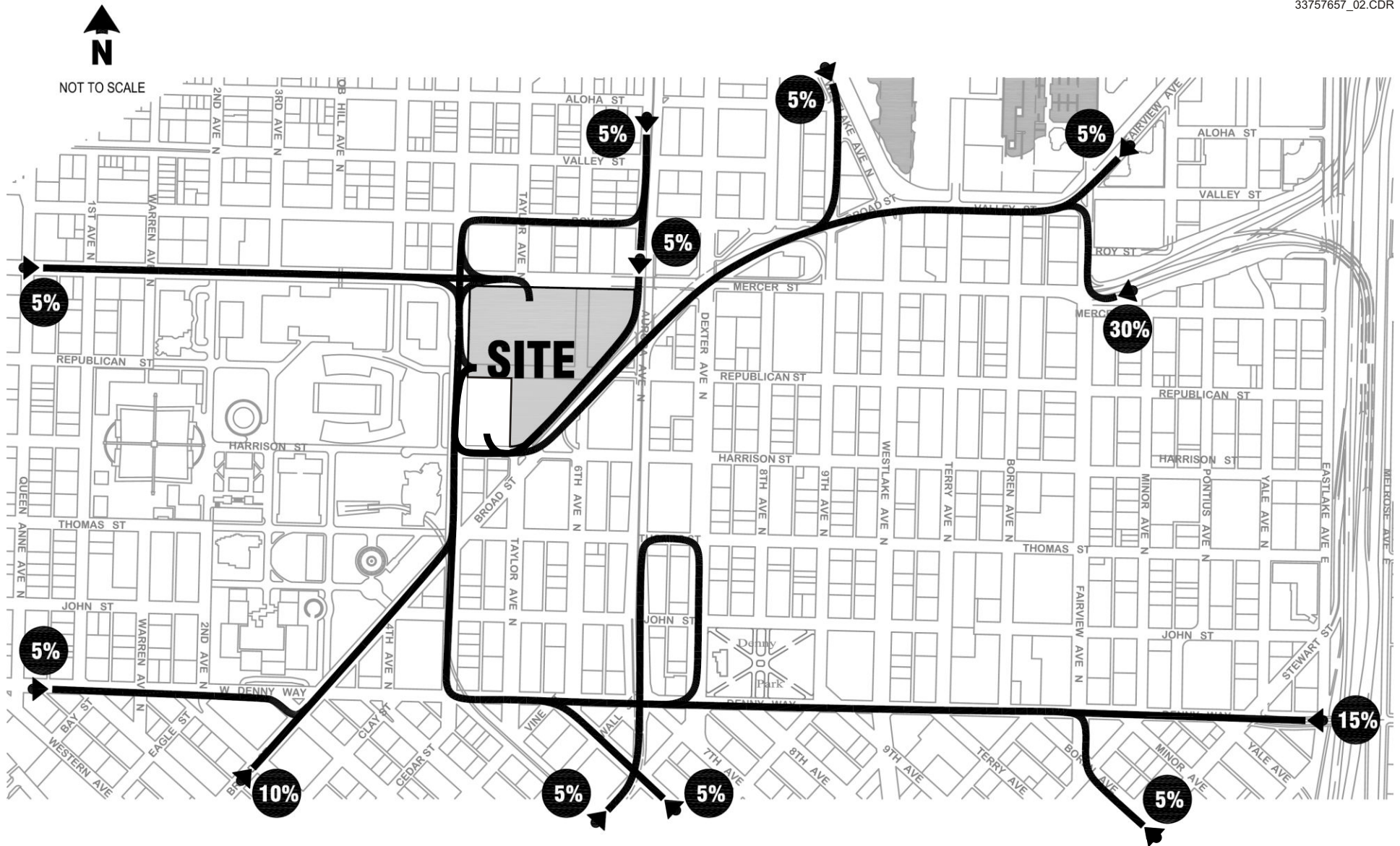
### Traffic Distribution and Assignment

Traffic associated with the *Alternative 2a* initial phase is expected to distribute to the surrounding local and regional facilities according to distribution data from SDOT and PSRC transportation models (Figures 3-1 and 3-2). The assigned project trips for each block are illustrated in Figure 8 of Appendix A.

### Traffic Volume Impacts

Peak hour traffic volumes for the *Alternative 2a* initial phase were developed by adding the project-generated trips to the *Alternative 1 (No Action)* initial phase peak hour traffic volumes at the study intersections. The resulting 2010 traffic volumes for the *Alternative 2a* initial phase are illustrated in Figure 9, ~~and~~ Tables 8 and 9 of Appendix A for a 450,000 square foot development, and Tables 2 and 3 of Appendix E for a 600,000 square foot development. These volumes were then compared with the *Alternative 1 (No Action)* initial phase traffic volumes.





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Figure 3-1  
Inbound Project Trip Distribution



Figure 3-2

### Outbound Project Trip Distribution

Beyond the immediate study area, traffic generated by the *Alternative 2a* initial phase would account for less than ten percent of the total entering traffic during the AM and PM peak hours. The portion of the study area bounded by Fifth Avenue North, Harrison Street, and Mercer Street would experience the greatest proportional increase in traffic volumes, ranging from approximately 4 to 25-31 percent. This is due to their close proximity to the project sites.

During the weekday AM peak hour, the proportional increase in traffic volumes at the most congested intersections range from 0.2 – 0.4<sup>11</sup> percent (4 – 7 trips) at the Howell Street/Yale Avenue intersection, to 4.3 – 5.7 percent (168 – 227 trips) at the intersection of Aurora Avenue/Denny Way. During the weekday PM peak hour, the proportional increase at the most congested intersections would be fewer than 5 percent with one exception: the intersection of Dexter Avenue/Mercer Street would increase by 7.4 – 9.6 percent (287 – 385 trips).

### ***Traffic Operations Impacts***

Traffic operations impacts include the consideration of changes in operations of study area intersections, as well as at the proposed site access at the points where it interfaces with abutting streets. This section also evaluates area-wide concurrency based on the City's screenline analysis.

#### **Intersection Level of Service**

Tables 3.1-7 and 3.1-8 provide a summary of the *Alternative 2a* initial phase weekday AM and PM peak hour levels of service for a 450,000 square foot development, respectively, for each block. For purposes of comparison, *Alternative 1* (No Action) initial phase levels of service are also provided. See Tables 4 and 5 in Appendix E for AM and PM levels of service for a 600,000 square foot development.

Five of the signalized study intersections would continue to operate at LOS F without or with the *Alternative 2a* initial phase, including Westlake Avenue/Mercer Street during the PM peak hour, Fairview Avenue/Mercer Street during both the AM and PM peak hours, Aurora Avenue/Denny Way during the PM peak hour, Stewart Street/Denny Way during the AM peak hour, and Howell Street/Yale Avenue during the PM peak hour. Project impacts to these locations are summarized below in terms of traffic volume impacts. When an intersection reaches LOS F, vehicle delay calculations are sensitive and may not provide a reliable measure of project impacts. Howell Street/Yale Avenue in the AM peak hour, Dexter Avenue/Mercer Street in the PM peak hour, and Fairview Avenue/Denny Way in the PM peak all would operate at LOS E with or without the project.

In addition, several locations are anticipated to degrade as a result of the addition of project traffic. They include:

- Ninth Ave./Broad St. - LOS C to LOS D (AM Peak Hour)
- Westlake Ave./Valley St. - LOS C to LOS D (AM Peak Hour), and LOS D to LOS E (PM Peak Hour)

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<sup>11</sup> Where a range of numbers is presented, the lower number represents the impacts of a 450,000 square foot development and the higher number represents the impacts of a 600,000 square foot development.

- Fairview Ave./Valley St. - LOS C to LOS D (AM Peak Hour)
- Fifth Ave./Republican St. – LOS A to LOS B (PM Peak Hour)
- Fifth Ave./Denny Way – LOS B to LOS C (PM Peak Hour)
- Aurora Ave./Denny Way - LOS D to LOS E (AM Peak Hour)
- Fairview Ave./Denny Way - LOS C to LOS D (AM Peak Hour)
- Stewart St./Denny Way – LOS D to LOS E (PM Peak Hour)

The intersection of Fifth Avenue/Broad Street is anticipated to improve from LOS C to LOS B in the PM peak hour.

The remaining study intersections would operate at the same level of service as with the *Alternative 1 (No Action)* initial phase during the PM peak hour.

**Table 3.1-7**  
**2010 Initial Phase AM Peak Hour LOS Summary – Alternative 2a**

#	Intersection	Alternative 1 (No Action)			Alternative 2a		
		LOS <sup>1</sup>	Delay <sup>2</sup>	V/C or WM <sup>3</sup>	LOS	Delay	V/C or WM
1	5 <sup>th</sup> Ave/Roy St	C	26.5	0.51	C	27.1	0.53
2	9 <sup>th</sup> Ave/Broad St	C	28.2	0.95	D	44.0	1.03
3	Westlake Ave/Valley St	C	23.7	0.88	D	41.8	0.95
4	Fairview Ave/Valley St	C	33.3	0.86	D	35.6	0.91
5	1 <sup>st</sup> Ave/Mercer St	B	14.2	0.50	B	14.4	0.51
6	5 <sup>th</sup> Ave/Mercer St	D	43.5	0.45	D	44.8	0.46
7	Dexter Ave/Mercer St	D	44.2	0.82	D	44.8	0.82
8	9 <sup>th</sup> Ave/Mercer St	C	27.5	0.76	C	27.5	0.77
9	Westlake Ave/Mercer St	C	21.9	0.81	C	22.9	0.81
10	Fairview Ave/Mercer St	F	>120.0	1.25	F	>120.0	1.34
11	5 <sup>th</sup> Ave/Republican	A	9.7	0.18	A	7.5	0.28
12	5 <sup>th</sup> Ave/Harrison St	C	34.2	0.36	C	31.4	0.46
13	Broad St/Harrison St*	C	19.0	EB	C	22.0	EB
14	5 <sup>th</sup> Ave/Broad St	D	47.6	0.53	D	47.3	0.61
15	1 <sup>st</sup> Ave/Denny Way	B	14.8	0.81	B	15.6	0.82
16	Broad St/Denny Way	C	20.4	0.76	C	20.8	0.76
17	5 <sup>th</sup> Ave/Denny Way	B	13.1	0.60	B	13.7	0.61
18	Aurora Ave/Denny Way	D	45.3	0.92	E	60.1	0.96
19	Dexter Ave/Denny Way	B	15.9	0.67	B	17.1	0.69
20	Westlake Ave/Denny Way	B	14.5	0.68	B	14.6	0.68
21	Fairview Ave/Denny Way	C	34.7	0.80	D	40.5	0.85
22	Stewart St/Denny Way	F	90.7	1.14	F	97.3	1.12
23	Stewart St/Yale Ave	A	5.2	– <sup>5</sup>	A	5.3	– <sup>5</sup>
24	Howell St/Yale Ave	E	66.7	1.04	E	68.0	1.05

1. Level of service, based on 2000 HCM methodology.

2. Average delay per vehicle, in seconds.

3. V/C = Volume-to-capacity ratio for signalized intersections, WM= worst movement/approach for unsignalized intersections.

4. Based on the v/c ratio of greater than 1.20, vehicle delay at this intersection may be greater than reported in the table.

5. Intersection runs on controller at Stewart Street/Denny Way; resulting v/c ratio not applicable to this intersection.  
 \* Unsignalized intersection

**Table 3.1-8**  
**2010 Initial Phase PM Peak Hour LOS Summary – Alternative 2a**

#	Intersection	Alternative 1 (No Action)			Alternative 2a		
		LOS <sup>1</sup>	Delay <sup>2</sup>	V/C or WM <sup>3</sup>	LOS	Delay	V/C or WM
1	5 <sup>th</sup> Ave/Roy St	C	20.1	0.66	C	22.7	0.69
2	9 <sup>th</sup> Ave/Broad St	C	25.4	0.92	C	25.5	0.93
3	Westlake Ave/Valley St	D	50.6	1.16	E	56.8	1.18
4	Fairview Ave/Valley St	C	28.9	0.77	C	29.4	0.79
5	1 <sup>st</sup> Ave/Mercer St	B	19.0	0.63	B	19.0	0.64
6	5 <sup>th</sup> Ave/Mercer St	C	26.5	0.63	C	26.8	0.65
7	Dexter Ave/Mercer St	E	68.3	1.04	E	68.1	1.10
8	9 <sup>th</sup> Ave/Mercer St	C	30.2	0.69	C	30.1	0.73
9	Westlake Ave/Mercer St	F	106.2	1.09	F	>120.0	1.14
10	Fairview Ave/Mercer St	F	>120.0	1.35	F	>120.0	1.39
11	5 <sup>th</sup> Ave/Republican	A	3.4	0.31	B	11.0	0.49
12	5 <sup>th</sup> Ave/Harrison St	C	30.2	0.58	C	30.3	0.61
13	Broad St/Harrison St*	C	18.0	EB	C	17.7	EB
14	5 <sup>th</sup> Ave/Broad St	C	21.4	0.55	B	19.6	0.56
15	1 <sup>st</sup> Ave/Denny Way	B	15.9	0.78	B	14.9	0.75
16	Broad St/Denny Way	C	20.6	0.71	C	21.6	0.73
17	5 <sup>th</sup> Ave/Denny Way	B	16.0	0.61	C	20.7	0.69
18	Aurora Ave/Denny Way	F	>120.0	1.13	F	>120.0	1.14
19	Dexter Ave/Denny Way	B	16.3	0.80	B	17.6	0.86
20	Westlake Ave/Denny Way	C	22.0	0.85	C	23.3	0.90
21	Fairview Ave/Denny Way	E	55.3	0.90	E	56.8	0.89
22	Stewart St/Denny Way	D	53.7	1.00	E	64.1	1.03
23	Stewart St/Yale Ave	B	15.5	– <sup>5</sup>	B	19.8	– <sup>5</sup>
24	Howell St/Yale Ave	F	>120.0	1.34	F	>120.0	1.39

1. Level of service, based on 2000 HCM methodology.

2. Average delay per vehicle, in seconds.

3. V/C = Volume-to-capacity ratio for signalized intersections, WM= worst movement/approach for unsignalized intersections.

4. Based on the v/c ratio of greater than 1.20, vehicle delay at this intersection may be greater than reported in the table.

5. Intersection runs on controller at Stewart Street/Denny Way; resulting v/c ratio not applicable to this intersection.

\* Unsignalized intersection

As documented in Appendix E, the additional traffic generated by the change in phasing to a 600,000 square foot Phase 1 is not anticipated to cause any additional study intersections to degrade to LOS F with the addition of project traffic. However, the addition of project traffic volumes at those intersections which already operate at LOS F with the Alternative 1 (No Action) initial phase may cause increased delay during the AM and PM peak hours. In addition, the 600,000 square foot Phase 1 would cause one intersection to degrade beyond the levels reported in the DEIS for the Alternative 2 initial phase. The Stewart Street/Yale Avenue intersection is anticipated to degrade from LOS B to LOS C during the PM peak hour due to

[the increase in trips generated by the 600,000 square foot Phase 1. All other study intersections would continue to operate at the same LOS as reported in the DEIS for the \*Alternative 2\* initial phase, and would be the same for \*Alternative 2a\*.](#)

### ***Site Access***

Three points of ingress and egress would be provided for the *Alternative 2a* initial phase. As described previously, access to the Seattle Center Parking Garage would be provided via the signalized intersection of Fifth Avenue/Republican Street, with a secondary access provided from Harrison Street, via a right-in/right-out only driveway. Access to the parking structure beneath the *Alternative 2a* initial phase is proposed to also be provided from the signalized intersection of Fifth Avenue/Republican Street via a subterranean connection through the Seattle Center Garage. A secondary, right-in/right-out only access to the parking structure beneath the *Alternative 2a* initial phase is proposed to be provided from Mercer Street, in the vicinity of Taylor Avenue. A driveway currently exists in the vicinity of the proposed Mercer Street driveway. The existing driveway is only opened after events at Seattle Center when the surface parking lot has been heavily utilized, and provides right-turn only exit to Mercer Street. The proposed driveway, which will be open at all times, will allow right-turns to and from Mercer Street. A LOS analysis was conducted for each site access intersection for the AM and PM peak hours. The LOS analysis showed that during both the AM and PM peak hours, each driveway would operate at LOS C or better.

### ***Transportation Concurrency***

Five screenlines were chosen for review, based on their location in relationship to the project sites and estimated influence areas. A screenline is an imaginary line drawn across several arterial roadways at a particular place. Concurrency for a project is evaluated by comparing the with project volume to capacity (v/c) ratio across a screenline against the screenlines established standard. The screenlines that were analyzed for concurrency review include the Magnolia and Ship Canal Bridges and South Lake Union. All affected screenlines would continue to operate better than required by the concurrency threshold without or with the proposed project.

### ***Transit Impacts***

Existing transit service is expected to accommodate the additional demand generated by the *Alternative 2a* initial phase with or without a Transportation Management Program (TMP) and, therefore, no significant adverse impacts to transit operations are expected to occur.

### ***Non-Motorized Travel Impacts***

No significant adverse impacts to non-motorized facilities or operations are expected to occur as a result of the *Alternative 2a* initial phase of development.

### ***Safety Impacts***

Adding *Alternative 2a* initial phase traffic volumes to study intersections and roadways would likely cause a proportionate increase in the probability of traffic accidents. The changes to the transportation system anticipated in the South Lake Union Transportation Study would result in a noticeably different environment for vehicles and pedestrians thereby enhancing safety. The



degree of increased traffic is not expected to result in a significant adverse impact.

### ***Parking Impacts***

**Code Requirements.** The City of Seattle's Land Use Code requires a minimum of 1.0 stall per 1,000 gross square feet of administrative office space. ~~The 420,000 square feet of office space proposed for construction in the initial phase would require 420 parking spaces. The Seattle Center has agreed to covenant a total of 300 spaces in the new garage, of which 54 spaces would be allocated to the Visitor Learning Center and retail space, and 246 spaces for campus parking. These covenanted spaces would meet a portion of the code required parking and also meet a portion of the parking demand (see below).~~ As shown in Table 3.1-3 above, the Seattle Center has 360 parking spaces in excess of Title 23 parking requirements.

~~The 420,000 square feet of office space proposed for construction in the initial phase would require 420 parking spaces.~~ The code required parking for the 420,000 square foot campus will be provided by constructing approximately 204 spaces on-site underneath the initial phase buildings and by 216 covenanted parking spaces in the adjacent Seattle Center garage, for a total of 420 spaces.

~~The revised design with a 600,000 square foot initial phase would require 600 parking spaces. The code required parking for the 600,000 square foot campus would be provided by constructing approximately 412 spaces on-site underneath the initial phase buildings and by 188 covenanted spaces in the Seattle Center garage, for a total of 600 spaces. The Seattle Center has agreed to covenant a total of 300 spaces in the new garage. These covenanted spaces would meet a portion (216 spaces) of the code required parking and also meet a portion of the parking demand (see below).~~

**On-Site and Covenanted Parking Supply.** On-site parking is proposed both below the *Alternative 2a* initial phase building(s), and in the proposed Seattle Center Parking Garage. A total of approximately 204 parking stalls are proposed as part of the *Alternative 2a* initial phase for the 420,000 square foot development and approximately 412 parking stalls are proposed for the 600,000 square foot initial phase. In addition to the approximately 204 - 412 spaces being provided on-site, the Seattle Center has agreed to provide a covenant for 246 stalls in the Seattle Center Parking Garage for exclusive daily use (up to 6:00 pm Monday through Friday). For the *Alternative 2a* initial phase there would be a total parking supply of 450 parking stalls for the 420,000 square foot Phase 1 and 658 parking stalls for the 600,000 square foot Phase 1.

**Parking Demand.** Parking demand for the *Alternative 2a* initial phase was calculated considering the size, typical employee density, daily occupancy, and travel mode split of the proposed project. This component yields a demand for long-term commuter parking. The mode-split assumptions are consistent with those identified in the travel mode split section of the *Alternative 2a* initial phase trip generation analysis, which was summarized previously in Table 3.1-5. In addition, short-term parking demand required by office use is also considered and is based on rates consistent with previously accepted rates for numerous other Seattle development projects. Calculation worksheets for the parking demand analysis are provided as ~~an~~ an-attachments to Appendix A and Appendix E.

Peak parking demand for the *Alternative 2a* initial phase would total 1,033 parking stalls for a

[420,000 square foot development](#). Assuming a total of 450 parking spaces for the *Alternative 2a* initial phase would have an effective supply of 95 percent, or 428 spaces, the peak demand would exceed supply by 605 parking stalls in the unmitigated scenario of the *Alternative 2a* initial phase<sup>12</sup>. A TMP, as discussed in the Mitigation section, could reduce the parking demand to 732 stalls. The calculation worksheets provided in an attachment to Appendix A illustrate the effect of the TMP goals. Therefore, with a TMP in place, parking demand associated with the *Alternative 2a* initial phase would exceed the proposed parking supply by 304 spaces.

[In comparison for an initial phase of 600,000 square feet, peak parking demand for the \*Alternative 2a\* initial phase would total 1,475 parking stalls. Assuming a total of 658 parking spaces for the \*Alternative 2a\* initial phase would have an effective supply of 95 percent, or 625 spaces, the peak demand would exceed supply by 850 parking stalls in the unmitigated scenario of the \*Alternative 2a\* initial phase<sup>13</sup>. A TMP, as discussed in the Mitigation section, could reduce the parking demand to 1,045 stalls. The calculation worksheets provided in an attachment to Appendix E illustrate the effect of the TMP goals. Therefore, with a TMP in place, parking demand associated with the \*Alternative 2a\* initial phase of 600,000 square feet would exceed the proposed parking supply by 420 spaces.](#)

**Table 3.1-9**  
**Alternative 2a Initial Phase Parking Summary**

Alternative/Phase	Proposed Parking Supply	Parking Code Regulations	Practical Parking Supply <sup>1</sup>	Parking Demand	Parking Surplus/Deficit <sup>2</sup>
Base Mode Split Assumptions					
Alternative 2a Initial Phase					
<a href="#">420,000 sf</a>	450	420	428	1,033	-605
<a href="#">600,000 sf</a>	<a href="#">658</a>	<a href="#">600</a>	<a href="#">625</a>	<a href="#">1,475</a>	<a href="#">-850</a>
Moderate TMP Assumptions					
Alternative 2a Initial Phase					
<a href="#">420,000 sf</a>	450	420	428	942	-514
<a href="#">600,000 sf</a>	<a href="#">658</a>	<a href="#">600</a>	<a href="#">625</a>	<a href="#">1,345</a>	<a href="#">-720</a>
Aggressive TMP Assumptions					
Alternative 2a Initial Phase					
<a href="#">420,000 sf</a>	450	420	428	732	-304
<a href="#">600,000 sf</a>	<a href="#">658</a>	<a href="#">600</a>	<a href="#">625</a>	<a href="#">1,045</a>	<a href="#">-420</a>

1. Assumes a 5% reduction to account for the practical capacity of the parking supply.

2. A parking deficit is indicated by a negative number, a parking surplus is shown by a positive number.

The 2004 parking utilization data for Seattle Center parking facilities are included as Appendix B. As shown in the table in Appendix B, there are an adequate number of available parking

<sup>12</sup> The 428-space amount is based on the total 450 stalls reduced by a practical capacity factor that takes into account the efficiency lost by circulating the garage in search of a vacant stall.

<sup>13</sup> The ~~428~~[625](#)-space amount is based on the total ~~450~~[658](#) stalls reduced by a practical capacity factor that takes into account the efficiency lost by circulating the garage in search of a vacant stall.

spaces in nearby parking lots and garages for all except for three weekdays per year. Table 3.1-10 below provides a summary of the average weekday usage and average availability of the Mercer Street Garage, the First Avenue North Garage, and the Seattle School District's Memorial Stadium parking lot. On an average weekday, there would be over 2,000 parking spaces available in these other nearby parking facilities.

**Table 3.1-10**  
**Alternative 2a Initial Phase Additional Parking Needs Compared With**  
**Available Weekday Parking in Nearby Facilities**

		Mercer Street Garage	First Avenue North Garage	Memorial Stadium Lot
<b>Alternative 2a Additional Parking Needs<sup>1</sup></b>	<b>304 - 420 spaces</b>			
Total Parking Supply		1439	654	268
Average Weekday Usage <sup>2</sup>		< 176 spaces	< 125 spaces	< 60 spaces
<b>Available Supply</b>	<b>2052 total spaces</b>	1263 spaces	529 spaces	260 spaces

1. Based on the deficit of on-site and covenanted parking identified in Table 3.1-9 above.

2. Average weekday usage derived from a review of the Seattle Center parking utilization data provided for November 2003 – December 2004 included in Appendix B.

### Alternative 3 Initial Phase

The development proposed to occur under the *Alternative 3a* initial phase would include the same characteristics as the development identified for the *Alternative 2a* initial phase. Therefore, the impacts associated with the *Alternative 3a* initial phase would be consistent with those documented above for the *Alternative 2a* initial phase.

### Alternative 4 Initial Phase

The development proposed to occur under the *Alternative 4* initial phase would include the same characteristics as the development identified for the *Alternative 2a* initial phase. It is not anticipated that the improvements planned for Mercer Street between Fifth Avenue North and Dexter Avenue North, Sixth Avenue North, or Aurora Avenue North would be complete prior to 2010. Therefore, the impacts associated with the *Alternative 4a* initial phase would be consistent with those documented above for the *Alternative 2a* initial phase.



### 3.1.3 Impacts of the 2025 Build-Out Project Alternatives

This section of the EIS describes the expected traffic and parking conditions within the study area for both of the build-out project alternatives. The impacts associated with the build-out of the project alternatives are evaluated for a horizon year of 2025.

#### Alternative 1 Build-Out (No Action)

This section of the EIS describes expected traffic and parking conditions within the study area if no new development were to occur on the project site. The *Alternative 1 (No Action)* build-out assumes that the existing land uses, structures, parking, and driveways would remain and provides a baseline for comparing each of the development alternatives. The traffic, circulation, and parking analysis for the *Alternative 1 (No Action)* build-out was conducted for AM and PM peak hour conditions in the year 2025, consistent with the year of the *Alternative 2a*, *3a*, and *4a* build-out.

#### 2025 Planned Improvements

While there is a higher likelihood that some of the improvements which were described, but not included in the initial phase analysis, would be implemented by 2025, no additional improvements were relied on as a No Action condition in this analysis. While funding mechanisms have been put in place, full funding remains uncertain, and to incorporate some or all of the improvements would be speculative.

It is noted that some of the projects identified in the South Lake Union Transportation Plan, and components of the Alaskan Way Viaduct may be partially or fully constructed by 2025. However, funding is not currently assured, thus this analysis did not rely on these improvements. The exception to this is that the analysis of the *Alternative 4a* build-out assumes the improvements planned for Mercer Street, [between Fifth Avenue North and Dexter Avenue North](#), and Aurora Avenue in the design of the campus.

#### Traffic Volumes

To enable this document to identify all the impacts associated with the *Alternative 2a*, *3a*, and *4a* build-out, the traffic generated by the *Alternative 2a* initial phase was not included in 2025 *Alternative 1* (No Action) traffic volumes. The methodology used to estimate 2025 peak hour traffic volumes for the analysis of the project build-out is consistent with that used in the analysis of the initial phase. An annually compounded growth rate of 0.5 percent was applied to existing (year 2005) peak hour volumes to account for general traffic growth in the study area projected by the year 2025. In addition, 2025 peak hour traffic volume estimates include AM and PM peak hour traffic volumes generated by planned development (pipeline) projects.

The pipeline projects remain unchanged from those included in the analysis of the initial phase. However, to account for the more distant horizon year, and to reflect that additional (currently unknown) pipeline projects would likely be constructed by 2025, the 25 percent reduction in pipeline project traffic was not taken for this analysis. The 2025 traffic forecasts are shown in Appendix A, Figure 10.

### ***Traffic Operations***

Tables 3.1-11 and 3.1-12 summarize 2025 LOS with *Alternative 1*. The following list summarizes the four study intersections that would continue to operate poorly under the 2025 *Alternative 1* (No Action) and the seven study intersections where the LOS is expected to degrade to LOS E or F between existing conditions and the 2025 *Alternative 1* (No Action). They include:

- Westlake Ave./Valley St. - LOS B to LOS F (PM peak hour)
- Dexter Ave./Mercer St. - LOS E to LOS F (PM peak hour)
- Westlake Ave./Mercer St. - LOS B to LOS F (PM peak hour)
- Fairview Ave./Mercer St. - LOS F to LOS F (AM peak hour), and LOS E to LOS F (PM peak hour)
- Fifth Ave./Broad St. - LOS D to LOS E (AM peak hour)
- Aurora Ave./Denny Way - LOS C to LOS F (AM peak hour), and LOS E to LOS F (PM peak hour)
- Fairview Ave./Denny Way - LOS D to LOS E (PM peak hour)
- Stewart Ave./Denny Way - LOS D to LOS F (AM peak hour), and LOS C to LOS F (PM peak hour)
- Howell St./Yale Ave. - LOS D to LOS F (AM peak hour), and LOS E to LOS F (PM peak hour)

Appendix A provides additional information regarding the basis for the operational conditions summarized above.

### ***Transit & Rail***

By the year 2025, it is anticipated that the Transit Tunnel will have been reopened following the completion of construction to accommodate new track construction for Light Rail. Therefore, transit that was re-routed to surface streets during the closure will have returned to the tunnel. In addition, bus transit headways are expected to increase while overall transit service headways are expected to be reduced through downtown, since rail service will attract a portion of transit ridership. The number of routes and the frequency of routes traveling through downtown and near the project site are assumed to be similar to current conditions. It is not anticipated that any changes are likely to be made to the existing Seattle Center Monorail which would result in operations being significantly different than those documented above for existing conditions. As stated previously in the planned improvements section for the initial phase, the South Lake Union Streetcar is anticipated to be complete by 2007, and would improve transit connectivity through the study area. This is anticipated to increase transit travel within the study area compared to 2005 existing levels. No significant adverse impact to transit or rail travel is anticipated under *Alternative 1*.

### ***Non-Motorized Facilities***

As stated in the *Planned Improvements* portion of this section, no changes to the non-motorized facilities within the study area are anticipated by 2025. While non-motorized travel is anticipated to increase within the study area compared to 2005 existing levels, existing non-motorized facilities are anticipated to accommodate anticipated growth.

### **Safety**

Impacts would be similar to those described for *Alternative 1* as a result of the initial phase of development.

### **Parking**

With *Alternative 1 (No Action)*, parking supply in the project vicinity and on the project site is expected to increase relative to the existing conditions documented in the *Affected Environment* section above. No changes to on-street parking supply are identified by SDOT in the site vicinity. The *Alternative 1 (No Action)* would maintain current on-site parking supply for the existing uses. An additional 1,038 parking stalls would be available in the proposed Seattle Center Parking Garage which is anticipated to be complete prior to 2025.

### **Alternatives 2a and 3a Build-Out**

This section documents traffic conditions within the study area in 2025 with build-out development according to either *Alternative 2a* or *Alternative 3a*. While the land use quantities and thus impacts are different, the differences are not substantial and will result in similar impacts, and are thus described together, where appropriate.

### **Street System**

No off-site modifications to street channelization or intersection control are proposed as part of either the *Alternative 2a* or *Alternative 3a* build-out. Development associated with both the *Alternative 2a* build-out and the *Alternative 3a* build-out would improve existing sidewalks on the site frontage along Mercer Street, Harrison Street and Fifth Avenue North.

### **Traffic Generation**

Trip generation estimates for build-out were developed using the same methodology used to estimate trip generation for the initial phase, with the exception of the mode split assumptions. For build-out it was assumed that a TMP would be in place, and result in 30 percent transit/bike/walk, 20 percent carpool, and 50 percent single occupant vehicle.

Table 3.1-11 summarizes the trip generation for each alternative. Average weekday traffic would range from about 5,100 to 5,600 vehicles for *Alternative 3a* and *Alternative 2a* respectively. Peak hour traffic would range from about 900 to 1,100 vehicles per hour, depending on the alternative of time period.

**Table 3.1-11**  
**2025 Build-Out – Net New Trip Generation**

Time Period	Daily	AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
Alternative 2a Build-Out	5,625	975	75	1050	100	885	985
Alternative 3a Build-Out	5,060	880	65	945	90	795	885

### ***Distribution and Assignment***

Traffic associated with both the *Alternative 2a* build-out and the *Alternative 3a* build-out is expected to distribute to surrounding local and regional roadways based on the same percentages outlined in Table 7 of Appendix A and illustrated in Figures 3-1 and 3-2 for the initial phase. The resulting AM and PM peak hour assignments of project-generated traffic are illustrated in Figures 11 and 12 of Appendix A for the *Alternative 2* build-out and the *Alternative 3* build-out respectively, and would be the same for Alternatives 2a and 3a.

### ***Traffic Volume Impacts***

The understanding of the proportional effect of project traffic is described in detail in Appendix A, and illustrated in Appendix A, Figures 13 and 14, and in Tables 18 and 19. As described in relation to impacts under the initial phase of development, impacts would be concentrated near the site, and diffuse with progressive distance from the site. Overall percentages would be higher, as described in Appendix A.

### ***Traffic Operations Impacts***

#### **Intersection Level of Service**

Tables 3.1-12 and 3.1-13 provide a summary of the build-out project alternatives' weekday AM and PM peak hour levels of service, respectively, for each intersection. For purposes of comparison, *Alternative 1 (No Action)* levels of service are also provided.

Seven of the signalized study intersections will continue to operate at LOS F with or without the *Alternative 2a* build-out or *Alternative 3a* build-out. Project impacts to these locations are summarized below. When an intersection reaches LOS F, vehicle delay calculations are sensitive and may not provide a reliable measure of project impacts.

During the AM and PM peak hours, the addition of traffic generated by the *Alternative 2a* build-out would cause the level of service at the following intersections to degrade:

- Fifth Ave./Roy St. - LOS C to LOS D (PM Peak Hour)
- Ninth Ave./Broad St - LOS D to LOS F (AM Peak Hour), and LOS C to LOS D (PM Peak Hour)
- Westlake Ave./Valley St. - LOS D to LOS F (AM Peak Hour)
- Fairview Ave./Valley St. - LOS D to LOS E (AM Peak Hour)
- Fifth Ave./Republican St. - LOS A to LOS B (PM Peak Hour)
- Broad St./Harrison St. - LOS C to LOS D (AM Peak Hour)
- First Ave./Denny Way - LOS B to LOS C (PM Peak Hour)
- Dexter Ave./Denny Way - LOS B to LOS C (AM Peak Hour), and LOS C to LOS D (PM Peak Hour)
- Westlake Ave./Denny Way - LOS C to LOS D (PM Peak Hour)
- Fairview Ave./Denny Way - LOS D to LOS E (AM Peak Hour), and LOS E to LOS F (PM Peak Hour)

The addition of project traffic generated by the *Alternative 3a* build-out would result in similar changes in intersection operations as the *Alternative 2a* build-out during the AM and PM peak hours, with the following exceptions:

- Fifth Ave./Roy St. - LOS C to LOS C (PM Peak Hour)
- Ninth Ave./Broad St. - LOS D to LOS E (AM Peak Hour)
- Westlake Ave./Valley St. - LOS D to LOS E (AM Peak Hour)
- First Ave./Denny Way - LOS B to LOS B (PM Peak Hour)
- Fifth Ave./Republican St. - LOS A to LOS A (PM Peak Hour)

**Table 3.1-12**  
**2025 Build-Out AM Peak Hour LOS Summary**

#	Intersection	Alternative 1 (No Action)			Alternative 2a			Alternative 3a		
		LOS <sup>1</sup>	Delay <sup>2</sup>	V/C or WM <sup>3</sup>	LOS	Delay	V/C or WM	LOS	Delay	V/C or WM
1	5 <sup>th</sup> Ave/Roy St	C	28.0	0.55	C	28.9	0.59	C	28.8	0.59
2	9 <sup>th</sup> Ave/Broad St	D	42.3	1.02	F	82.1	1.15	E	77.9	1.14
3	Westlake Ave/Valley St	D	35.2	1.11	F	81.0	1.15	E	70.9	1.17
4	Fairview Ave/Valley St	D	39.9	0.95	E	65.0	1.03	E	62.1	1.02
5	1 <sup>st</sup> Ave/Mercer St	B	15.1	0.56	B	15.6	0.57	B	15.5	0.57
6	5 <sup>th</sup> Ave/Mercer St	D	46.0	0.49	D	38.9	0.51	D	39.8	0.51
7	Dexter Ave/Mercer St	D	50.1	0.90	D	51.8	0.91	D	51.7	0.90
8	9 <sup>th</sup> Ave/Mercer St	D	39.2	0.84	D	39.0	0.84	D	39.1	0.84
9	Westlake Ave/Mercer St	C	26.8	0.90	C	26.7	0.90	C	27.3	0.90
10	Fairview Ave/Mercer St	F	>120.0	1.40	F	>120.0	1.52	F	>120.0	1.51
11	5 <sup>th</sup> Ave/Republican	A	9.9	0.20	A	7.1	0.34	A	6.9	0.33
12	5 <sup>th</sup> Ave/Harrison St	C	34.1	0.37	C	30.5	0.55	C	30.7	0.54
13	Broad St/Harrison St*	C	20.9	EB	D	27.5	EB	D	26.7	EB
14	5 <sup>th</sup> Ave/Broad St	E	57.6	0.58	E	55.9	0.72	E	56.0	0.70
15	1 <sup>st</sup> Ave/Denny Way	C	23.2	0.88	C	26.6	0.90	C	26.4	0.89
16	Broad St/Denny Way	C	25.3	0.85	C	26.1	0.85	C	25.9	0.85
17	5 <sup>th</sup> Ave/Denny Way	B	13.9	0.68	B	15.3	0.69	B	15.4	0.67
18	Aurora Ave/Denny Way	F	80.6	1.02	F	116.2	1.09	F	112.2	1.08
19	Dexter Ave/Denny Way	B	18.1	0.81	C	20.8	0.86	C	20.5	0.86
20	Westlake Ave/Denny Way	B	18.8	0.77	B	19.1	0.81	B	19.1	0.81
21	Fairview Ave/Denny Way	D	51.1	0.91	E	75.0	0.99	E	72.5	0.98
22	Stewart St/Denny Way	F	>120.0	1.26	F	>120.0	1.27	F	>120.0	1.26
23	Stewart St/Yale Ave	A	6.1	– <sup>5</sup>	A	6.3	– <sup>5</sup>	A	6.3	– <sup>5</sup>
24	Howell St/Yale Ave	F	94.6	1.18	F	97.7	1.19	F	97.4	1.18

1. Level of service, based on 2000 HCM methodology.

2. Average delay per vehicle, in seconds.

3. V/C = Volume-to-capacity ratio for signalized intersections, WM= worst movement/approach for unsignalized intersections.

4. Based on the v/c ratio of greater than 1.20, vehicle delay at this intersection may be greater than reported in the table.

5. Intersection runs on controller at Stewart/Denny; resulting v/c ratio not applicable to this intersection.

\* Unsignalized intersection

At the remaining study intersections, average intersection delays with the *Alternative 3a* build-

out would be up to approximately five seconds shorter than with the *Alternative 2a* build-out. The remaining study intersections would operate at the same level of service as *Alternative 1 (No Action)* build-out during the AM and PM peak hours.

**Table 3.1-13**  
**2025 Build-Out PM Peak Hour LOS Summary**

#	Intersection	Alternative 1 (No Action)			Alternative 2a			Alternative 3a		
		LOS <sup>1</sup>	Delay <sup>2</sup>	V/C or WM <sup>3</sup>	LOS	Delay	V/C or WM	LOS	Delay	V/C or WM
1	5 <sup>th</sup> Ave/Roy St	C	25.4	0.72	D	35.7	0.76	C	33.1	0.76
2	9 <sup>th</sup> Ave/Broad St	C	34.8	0.99	D	38.3	1.01	D	37.9	1.01
3	Westlake Ave/Valley St	F	85.6	1.28	F	98.4	1.31	F	97.3	1.31
4	Fairview Ave/Valley St	C	31.1	0.85	C	31.9	0.87	C	31.8	0.87
5	1 <sup>st</sup> Ave/Mercer St	C	20.9	0.69	C	21.0	0.70	C	21.0	0.70
6	5 <sup>th</sup> Ave/Mercer St	C	28.6	0.69	C	33.6	0.72	C	34.5	0.72
7	Dexter Ave/Mercer St	F	83.8	1.18	F	87.8	1.27	F	86.3	1.23
8	9 <sup>th</sup> Ave/Mercer St	C	31.0	0.74	C	31.2	0.80	C	31.1	0.80
9	Westlake Ave/Mercer St	F	>120.0	1.25	F	>120.0	1.32	F	>120.0	1.31
10	Fairview Ave/Mercer St	F	>120.0	1.50	F	>120.0	1.56	F	>120.0	1.55
11	5 <sup>th</sup> Ave/Republican	A	8.3	0.34	B	13.8	0.61	B	12.0	0.59
12	5 <sup>th</sup> Ave/Harrison St	C	31.7	0.63	C	34.1	0.69	C	29.5	0.53
13	Broad St/Harrison St*	C	19.6	EB	C	20.0	EB	C	20.0	EB
14	5 <sup>th</sup> Ave/Broad St	C	22.9	0.60	C	20.0	0.62	C	20.5	0.62
15	1 <sup>st</sup> Ave/Denny Way	B	19.5	0.85	C	20.0	0.86	B	19.9	0.86
16	Broad St/Denny Way	C	22.5	0.79	C	23.4	0.83	C	23.4	0.83
17	5 <sup>th</sup> Ave/Denny Way	B	17.5	0.67	B	19.1	0.71	B	18.0	0.71
18	Aurora Ave/Denny Way	F	>120.0	1.26	F	>120.0	1.27	F	>120.0	1.27
19	Dexter Ave/Denny Way	C	26.3	0.93	D	50.1	1.02	D	47.5	1.01
20	Westlake Ave/Denny Way	C	36.1	1.02	D	45.0	1.13	D	46.2	1.10
21	Fairview Ave/Denny Way	E	77.4	1.01	F	89.2	1.05	F	87.7	1.04
22	Stewart St/Denny Way	F	87.2	1.12	F	106.5	1.17	F	104.3	1.16
23	Stewart St/Yale Ave	C	21.6	– <sup>5</sup>	C	34.5	– <sup>5</sup>	C	33.0	– <sup>5</sup>
24	Howell St/Yale Ave	F	>120.0	1.51	F	>120.0	1.59	F	>120.0	1.59

1. Level of service, based on 2000 HCM methodology.

2. Average delay per vehicle, in seconds.

3. V/C = Volume-to-capacity ratio for signalized intersections, WM= worst movement/approach for unsignalized intersections.

4. Based on the v/c ratio of greater than 1.20, vehicle delay at this intersection may be greater than reported in the table.

5. Intersection runs on controller at Stewart/Denny; resulting v/c ratio not applicable to this intersection.

\* Unsignalized intersection

### ***Site Access***

The three points of ingress and egress remain unchanged from that described for the initial phase. A LOS analysis conducted for each site access intersection showed that the site access intersections are estimated to operate at LOS C or better during both the AM and PM peak hours. The results indicate the site access intersections would provide adequate capacity for the proposed garage access locations.

### ***Transportation Concurrency***

The transportation concurrency analysis indicates that with traffic generated by either of the build-out alternatives, the screenlines would have volume to capacity (v/c) ratios that are less than the City level of service threshold and thus, the alternatives would meet concurrency requirements.

### ***Transit Impacts***

With site specific programs like a TMP or Commute Trip Reduction (CTR) in place, the transit mode split is expected to represent up to 30 percent of total person trips generated by the build-out alternatives. Under the *Alternative 2a* build-out, approximately 2,870 daily transit trips would be generated by the development. Of those, approximately 535 transit trips would occur during the AM peak hour and approximately 505 transit trips during the PM peak hour. For *Alternative 3a*, approximately 2,580 daily, 485 AM peak and 455 PM peak transit trip would occur.

Foundation employees would use existing transit routes and the monorail as described in relation to the initial phase. No noticeable numbers of foundation employees were assumed to use the proposed South Lake Union Streetcar due to the distance between the campus and the streetcar route, and the presence of Aurora Avenue between the two locations. Existing transit service is expected to accommodate the additional demand generated by the *Alternative 2a* build-out or *Alternative 3a* build-out with a TMP program and, therefore, no significant adverse impacts to transit operations are expected to occur.

### ***Non-Motorized Travel Impacts***

As part of the build-out alternatives the existing sidewalks on each project site frontage would be improved. The build-out alternatives would also provide secure bicycle storage on the project site.

Existing non-motorized facilities within the study area are expected to accommodate the portion of the *Alternative 2a* build-out trip generation that is expected to walk or bike to the project site. The *Alternative 2a* build-out would not degrade any existing facilities; the redevelopment would enhance those facilities directly adjacent to each site. Thus, no significant adverse impacts to non-motorized facilities or operations are expected to occur as a result of the *Alternative 2a* build-out of development. The *Alternative 3a* build-out is anticipated to generate fewer non-motorized trips than the *Alternative 2a* build-out, due to the reduced development size. Therefore, no significant adverse impacts to non-motorized facilities or operations are expected to occur as a result of the *Alternative 3a* build-out of development.



### ***Safety Impacts***

Adding *Alternative 2a* build-out traffic volumes to study intersections and roadways would likely cause a proportionate increase in the probability of traffic accidents. Therefore, it is possible that the proportionate increase in traffic at the intersections of Fifth Avenue/Mercer Street, Ninth Avenue/Mercer Street, and Westlake Avenue/Denny Way may impact the existing safety hazard at these locations. The *Alternative 3* build-out traffic volumes would be similar to, though marginally less than, those associated with *Alternative 2a*. Therefore the potential increase in safety hazards also would be marginally less.

### ***Parking Impacts***

**Code Requirements.** The City of Seattle Land Use Code requires a minimum of 1.0 stalls per 1,000 gross square feet of administrative office space. For *Alternative 2a*, the requirement would be 1,000 stalls. For *Alternatives 3a* and *4a*, the requirement would be 900 stalls. The code required parking would be met by a combination of constructing a total of approximately 980 spaces on-site and the 300 covenanted spaces in the adjacent Fifth Avenue Parking Garage.

**On-Site and Covenanted Parking Supply.** On-site parking is proposed both below the *Alternative 2a* build-out, and in the proposed Seattle Center Parking Garage. A total of approximately 980 parking stalls are proposed as part of the *Alternative 2a* build-out. In addition to the approximately 980 spaces being provided on-site, the Seattle Center has agreed to covenant 300 stalls in the Seattle Center Parking Garage, of which 246 would be for exclusive daily use by campus employees (up to 6:00 pm Monday through Friday). For the *Alternative 2a* build-out, there would be a total parking supply of 1,226 stalls.

**Parking Demand.** Parking demand for the build-out alternatives was calculated using the same approach as for the initial phase, with the exception that mode-split assumptions are consistent with those identified for the build-out alternatives, assuming a TMP in place. Calculation worksheets for the parking demand analysis are provided in Appendix A [for Alternative 2 and would be the same for Alternative 2a](#).

Peak parking demand for the *Alternative 2a* build-out would total 1,742 parking stalls. Assuming a total of 1,226 parking spaces for the *Alternative 2a* build-out have an effective supply of 95 percent, or 1,165 spaces, the peak demand would exceed supply by approximately 577 parking stalls<sup>14</sup>. This excess parking demand would need to be accommodated through the use of available off-site off-street parking in the vicinity of the project site.

Peak parking demand for the *Alternative 3a* build-out would total 1,568 parking stalls. Assuming a total of 1,226 parking spaces for the *Alternative 3a* build-out have an effective supply of 95 percent, or 1,165 spaces, the peak parking demand would exceed the available on-site parking supply by 403 spaces.

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<sup>14</sup> The 1,165-space amount is based on the total 1,226 stalls reduced factored by a practical capacity factor that takes into account the efficiency lost by circulating the garage in search of a vacant stall.

**Table 3.1-14**  
**Build-Out Parking Summary**

Alternative/Phase	Proposed Parking Supply	Parking Code Regulations	Practical Parking Supply <sup>1</sup>	Parking Demand	Parking Surplus/Deficit <sup>2</sup>
Aggressive TMP Assumptions					
Alternative 2a Build-Out	1,226	1,000	1,165	1,742	-577
Alternative 3a Build-Out	1,226	900	1,165	1,568	-403

1. Assumes a 5% reduction to account for the practical capacity of the parking supply.  
2. A parking deficit is indicated by a negative number, a parking surplus is shown by a positive number.

The 2004 parking utilization data for Seattle Center parking facilities included as Appendix B shows there are an adequate number of available parking spaces in nearby parking lots and garages for all except for three weekdays per year. Table 3.1-15 below provides a summary of the average weekday usage and average availability of the Mercer Street Garage, the First Avenue North Garage, and the Seattle School District's Memorial Stadium parking lot, and indicates there would be over 2,000 parking spaces available in these other nearby parking facilities on an average weekday.

**Table 3.1-15**  
**Alternative 2 Build-Out Additional Parking Needs Compared With Available Weekday Parking in Nearby Facilities**

		Mercer Street Garage	First Avenue North Garage	Memorial Stadium Lot
<b>Alternative 2a Additional Parking Needs<sup>1</sup></b>	<b>577 spaces</b>			
Total Parking Supply		1439	1038	268
Average Weekday Usage <sup>2</sup>		< 176 spaces	<125 spaces	<60 spaces
<b>Available Supply</b>	<b>2052 total spaces</b>	1263 spaces	529 spaces	260 spaces

1. Based on the deficit of on-site and covenanted parking identified in Table 3.1-14 above.

2. Average weekday usage derived from a review of the Seattle Center parking utilization data provided for November 2003 – December 2004 included in Appendix B.

### Alternative 4 Build-Out

The development proposed to occur under the *Alternative 4a* build-out would include the same characteristics as the development identified for the *Alternative 3a* build-out, with the development of up to 900,000 square feet of office space spread through several buildings located in a campus setting. The difference between the *Alternative 3a* build-out and the *Alternative 4a* build-out is that the improvements planned for Mercer Street, [between Fifth Avenue North and Dexter Avenue North](#), and Aurora Avenue North have been assumed in the design of the campus.

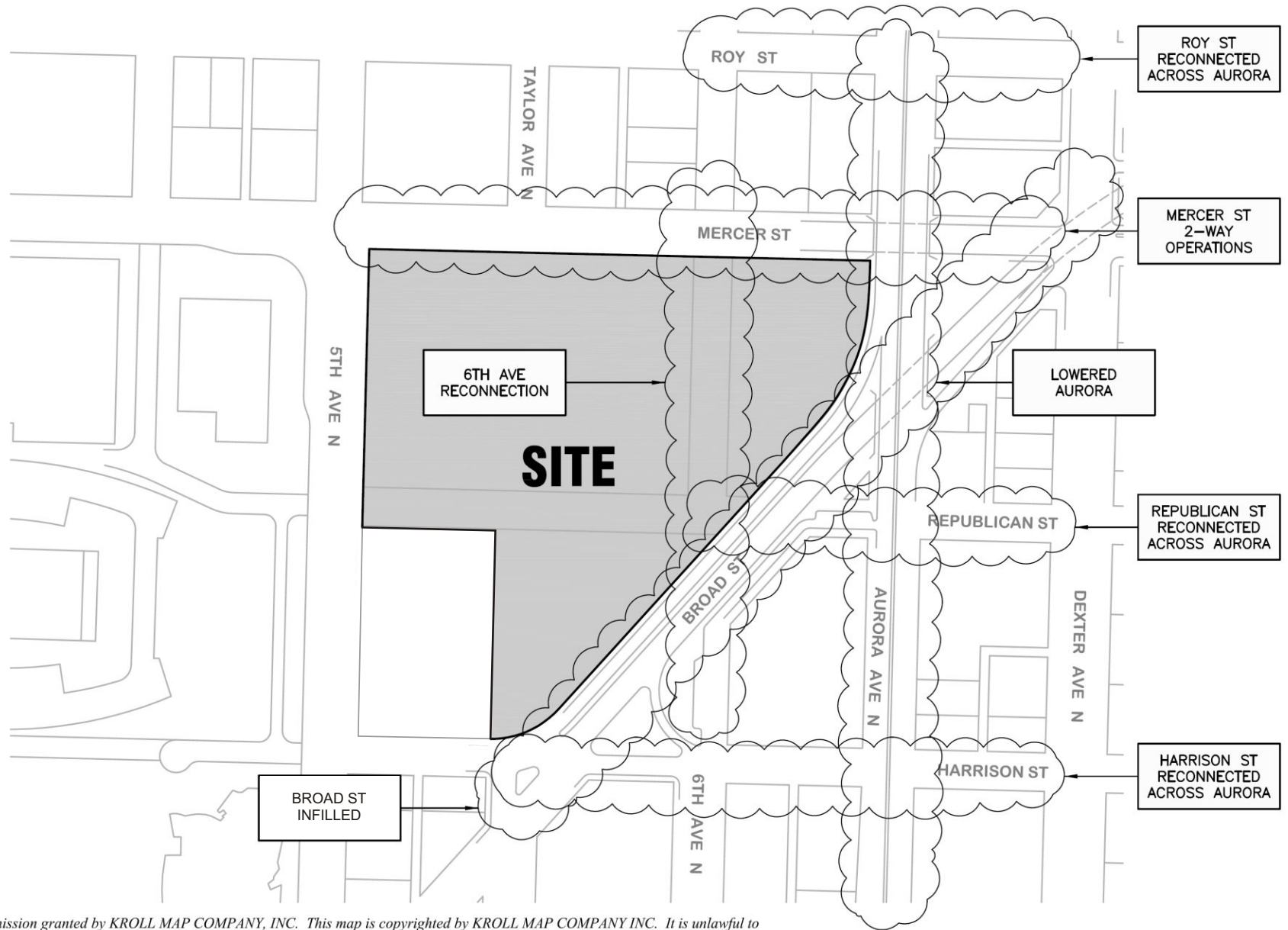
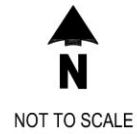
The Mercer Street improvements [from Fairview Avenue North to Dexter Avenue North proposed as part of the City's Mercer Corridor Project](#) call for the conversion of Mercer Street from one-way to two-way operations, with the provision of three-travel lanes in each direction and additional turn lanes at intersections. To enable this to occur, Valley Street would be narrowed to a three-lane section with bike lanes. Left turn lanes may be provided at key intersections, as needed, such as Westlake Avenue. These changes would reduce regional traffic on Valley Street while focusing traffic to/from I-5 onto Mercer Street. Mercer Street would also be reconnected across Aurora Avenue, as would Thomas Street.

The Aurora Avenue improvements would reconfigure access to/from Aurora Avenue to the north of the Battery Street tunnel. Options for providing additional east-west connections across Aurora Avenue are being explored as part of the ongoing Alaskan Way Viaduct EIS process. Most options include the extension of Sixth Avenue through the site to facilitate local circulation and overall accessibility to Aurora Avenue.

With these improvements in place, additional access to the site could be developed along the Sixth Avenue frontage. While overall system impacts would be similar, development of the more-direct access to the east would reduce impacts along the west site frontage intersections at Fifth Avenue at Harrison, Republican and Mercer Streets. With additional dispersion of access, the pressure of the added traffic load from the project would be more immediately dispersed, with less localized impact issues. Even if site access were to remain unchanged from the [Alternative 3a](#) build-out, the [Alternative 4a](#) build-out transportation infrastructure would offer more “grid-based” options for access to/from and through the South Lake Union neighborhood to the east, and would likely result in better operating conditions along Fifth Avenue, abutting the site to the west. A summary of the proposed conceptual changes to the transportation system in the immediate vicinity of the project site is illustrated in Figure 3-3.

With the reconnection of Sixth Avenue, freeway-destined project traffic would still impact Mercer Street, but would also have the option of using other streets crossing Aurora Avenue before accessing Mercer Street and the freeway. This would reduce project impacts to the Mercer Street corridor.

Thus, overall traffic and operational impacts of [Alternative 4a](#) would be similar, though less than those described for [Alternative 3a](#). Detailed analysis has been withheld until the Alaskan Way Viaduct project EIS is complete and more definition regarding the actual configuration of the street system and infrastructure has been provided.



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Figure 3-3  
**Site Vicinity Potential Infrastructure Improvements**

### 3.1.4 Mitigation Measures

This section identifies various measures that could offset or reduce transportation impacts of the project *Alternatives*. Although the development alternatives have specific design elements and uses with varying transportation and parking impacts, all of the development alternatives have common impacts that could be mitigated with a TMP and specific intersection improvements described above in the impact sections being proposed by the City of Seattle as part of the South Lake Union Transportation Plan or the Washington State Department of Transportation as part of the Alaskan Way Viaduct project.

Since the City does not have explicit thresholds for mitigation requirements, LOS E or LOS F results do not specifically mandate mitigation. However, a TMP is proposed to lessen the dependence of campus staff on single occupancy vehicles.

#### Transportation Management Program

The City will require that a TMP be developed for the proposed project consistent with the requirements of SDOT Director's Rule 94-3, and DPD's Director's Rule 14-2002 regarding TMPs. An appropriate TMP goal, progressive over time, will be identified through future discussions with City of Seattle DPD and SDOT staff as project plans are further developed. The TMP goals and supporting elements will be consistent with all City TMP requirements.

#### South Lake Union Transportation Plan

To the extent that the City has identified a transportation vision for the South Lake Union area that includes a substantial number of planned improvements, including conversion of Mercer Street to a two-way boulevard, it is possible that the City could propose that the project be conditioned to participate in funding these improvements on some level, depending on the identified level of impact. The actual level of participation would be the subject of further analysis and discussion, should it be proposed.

#### Overall Project Mitigation

In addition to the TMP and participation in the South Lake Union Transportation Plan, the following is a specific measure to mitigate transportation impacts.

- **Fairview Ave./Denny Way** (PM peak hour only) – this intersection would degrade from LOS E to LOS F during the PM peak hour with the addition of traffic generated by the build-out project *Alternatives*. However, the addition of project traffic generated by the build-out of *Alternatives 2a* and *3a* would increase intersection traffic volumes by 154 vehicles (3.5 percent) and 138 vehicles (3.1 percent) respectively during the PM peak hour. Optimization of the signal timing (cycle length and splits) at this intersection would improve PM peak hour operations at this intersection to LOS E with the *Alternative 2a* build-out and *Alternative 3a* build-out.

### 3.1.5 Potentially Unavoidable Adverse Impacts

This section documents those intersections where traffic generated by the development *Alternatives* would cause unavoidable adverse impacts at study intersections.

Impacts associated with each of the development *Alternatives* could be mitigated with a TMP and specific intersection improvements described above in the impact sections being proposed by the City of Seattle as part of the South Lake Union Transportation Plan or the Washington State Department of Transportation as part of the Alaskan Way Viaduct project, except for two intersections where limitations on improvement options and/or capacity restrictions and the proximity to the I-5 accesses likely will result in possible unavoidable adverse impacts.

- **Stewart St./Denny Way** (AM and PM peak hours) – this intersection would continue to operate at LOS F during both the AM and PM peak hours with or without the build-out project *Alternatives*. However, the addition of project traffic generated by the build-out of *Alternatives 2a* and *3a* would increase intersection traffic volumes by between 143 (2.8 percent) and 158 (3.1 percent) during the AM peak hour, and between 133 (3.1 percent) and 149 (3.4 percent) during the PM peak hour. Because improvement options are limited due to capacity restraints and its close proximity to the I-5 entrance and exit and could result in a possible unavoidable adverse impact.
- **Howell St./Yale Ave.** (AM and PM peak hours) – this intersection would continue to operate at LOS F during both the AM and PM peak hours with or without the build-out project *Alternatives*. However, the addition of project traffic generated by the build-out of *Alternatives 2a* and *3a* would increase intersection traffic volumes by between 7 (0.4 percent) and 8 (0.4 percent) during the AM peak hour, and between 80 (2.5 percent) and 89 (2.7 percent) during the PM peak hour. Beyond optimization of signal timing, which would not offset project impacts, mitigation options are limited at this intersection and could result in a possible unavoidable adverse impact.

### 3.1.6 Secondary and Cumulative Impacts

Due to the nature of the transportation analysis conducted for the 500 Fifth Avenue North project, secondary and cumulative impacts have been addressed as part of the primary analysis documented above.

## 3.2 Visitor Learning Center and Retail Space

With each action alternative, a visitor learning center and retail space may be constructed on the north end of the adjacent Seattle Center garage project. The visitor learning center would total approximately 26,000 square feet. The retail component would include an additional 10,000 square-feet.

### 3.2.1 Street System

No off-site modifications to street channelization or intersection control are proposed as part of the proposed visitor learning center/retail space.

### 3.2.2 Trip Generation

#### Visitor Learning Center

Trip generation data for the proposed or similar land uses are not published by the ITE in *Trip Generation*. Therefore, trip generation would typically be estimated based on programmatic data for the proposed development.

Since programmatic details regarding the use of the visitor learning center are not yet available, the Transpo Group has estimated trip generation for similar land uses using a programmatic approach, including the Seattle Art Museum (SAM) expansion and the Experience Music Project (EMP) expansion. It is anticipated that the trip generation characteristics of the proposed learning center would be similar to these other sites. Table 3.2-1 summarizes estimated trip generation for the proposed learning center based on the trip generation rates associated with the SAM and EMP expansion projects.

**Table 3.2-1  
Estimated VLC Peak Hour Trip Generation**

Land Use	Size <sup>1</sup>	Rate <sup>2</sup>	Project Trips		
			Total	In	Out
SAM Expansion Based	26,000 sf	0.57	15	5	10
EMP Expansion Based	26,000 sf	0.63	15	5	10

Gross area including public and support space  
Trips rates based on estimated trip generation derived from rates developed by Transpo in the environmental review of the Seattle Art Museum and Experience Music Project.

As shown in Table 3.2-1, based on the programmatic trip generation for similar land uses, the proposed learning center is estimated to generate 15 additional PM peak hour trips; significantly fewer AM peak hour trips would be generated, since the facility would not be open to the public until 10 a.m.

Actual trip generation associated with the proposed learning center may be lower than shown in Table 3.2-1, since the facility will be closely proximate to the EMP and Seattle Center, and the likelihood that many visitors may arrive in larger groups, such as school buses.



- **Proximity to Seattle Center** – it is likely that, due to the proximity of the visitor learning center to the Seattle Center, a portion of visitors to the learning center would also visit the Seattle Center. This would result in the *linking* of trips between the two uses, and reducing the number of net new trips associated with the proposed visitor learning center. No reduction was made to account for this characteristic.
- **Visitor Characteristics** – the expectation is that a large proportion of visitors to the visitor learning center would arrive in groups, i.e. school field trips. This would result in a higher average vehicle occupancy for the proposed project than for either the SAM or EMP. No reduction was made to account for this potential occurrence.

The combination of these factors would reduce the number of new PM peak hour trips generated by the proposed visitor learning center from the numbers documented in Table 3.2-1. Overall, however, it is recognized that even the unadjusted totals reflected in Table 3.2-1 are minor traffic volumes and unlikely to result in a noticeable impact on surrounding streets.

## Retail

The trip generation for the proposed retail space is based on the Institute of Transportation Engineers' (ITE) *Trip Generation*<sup>15</sup> methodology and local mode-split data in the South Lake Union area. Weekday PM peak hour trip generation by the proposed retail space was estimated. The detailed calculation worksheets are provided in Attachment A.

As shown in Table 3.2-2, the retail space would generate approximately 10 trips during the weekday PM peak hour.

**Table 3.2-2**  
**Estimated Retail PM Peak Hour Trip Generation**

Land Use	Size	Project Trips		
		Total	In	Out
Retail Space	10,000 sf	10	5	5

The combination of the proposed visitor learning center and retail space is expected to generate 25 new trips during the weekday PM peak hour.

### 3.2.3 Distribution and Assignment

Traffic associated with the proposed visitor learning center and retail space is expected to distribute to the surrounding local and regional facilities, according to regional distribution patterns, the same percentages that were used for evaluating traffic for the 500 Fifth Avenue North campus to the north. The percentages and distribution patterns are included in 500 Fifth Avenue North Traffic and Transportation Technical Report, March 2006.

### 3.2.4 Traffic Volumes Impacts

The addition of traffic generated by the proposed visitor learning center and retail space would

<sup>15</sup> ITE, 2003.

impact PM peak hour traffic volumes at intersections adjacent to the project site by less than approximately 2 percent. Away from the project site, traffic volume impacts would likely be less than 1 percent. Traffic volume impacts of this magnitude are typically indistinguishable from daily fluctuations in background traffic volumes.

### 3.2.5 Traffic Operations Impacts

Given the levels of service identified in relation to the other action alternatives, the added traffic associated with the visitor learning center would not change PM peak hour level of service at intersections in the study area. Table 3.2-3 illustrates the revised level of service at the three intersections along Fifth Avenue North, most proximate to the site. The corresponding LOS worksheets are included in Appendix C.

**Table 3.2-3  
PM Peak Hour LOS Summary**

#	Intersection	Alternative 2a Only			Alternative 2a with VLC/Retail		
		LOS <sup>1</sup>	Delay <sup>2</sup>	V/C or WM <sup>3</sup>	LOS	Delay	V/C or WM
6	5 <sup>th</sup> Ave/Mercer St	C	26.8	0.65	C	26.8	0.65
11	5 <sup>th</sup> Ave/Republican St	B	11.0	0.49	B	11.1	0.50
12	5 <sup>th</sup> Ave/Harrison St	C	30.3	0.61	C	30.5	0.61
13	Broad St/Harrison St	C	17.7	EB	C	17.7	EB
14	5 <sup>th</sup> Ave/Broad St	B	19.6	0.56	B	19.6	0.56

1. Level of service

2. Average delay per vehicle, in seconds

3. V/C = Volume-to-capacity ratio for signalized intersections, WM= worst movement/approach for unsignalized intersections.

As shown in Table 3.2-3, no changes in intersection levels of service or noticeable changes in delay would occur as a result of the proposed visitor learning center or retail space.

### 3.2.6 Site Access

Parking access to the proposed visitor learning center and retail space would be provided via the entrances to the Seattle Center Garage, via the signalized intersection of Fifth Avenue/Republican Street, with an additional access provided from Harrison Street, via a right-in/right-out only driveway. Service vehicles and buses associated with the visitor learning center would use the Harrison Street service corridor entrance, east of the garage access. The Republican Street and Harrison Street accesses would both continue to operate at LOS B during the PM peak hour with the addition of traffic generated by the proposed visitor learning center and retail space.

### 3.2.7 Transportation Concurrency

Transportation concurrency for the project would continue to be met with the addition of traffic generated by the proposed visitor learning center.

### 3.2.8 Transit Impacts

The visitor learning center is anticipated to generate few additional transit trips due to

anticipated uses and attendance. The retail space is anticipated to generate minimal additional transit trips. Existing transit service adjacent to the project site is anticipated to be able to accommodate any additional demand generated by the proposed visitor learning center and retail space. Therefore, no significant adverse impacts to transit operations are expected to occur.

In the event that school buses are used to bring school children to visit the visitor learning center, they will access the facility via the Harrison Street garage entrance, which will be designed to accommodate buses.

### **3.2.9 Non-Motorized Travel Impacts**

The pedestrian entrances to the visitor learning center and retail space would be at or near the corner of Fifth Avenue North and Republican Street. Existing non-motorized facilities within the study are expected to accommodate the portion of the visitor learning center trip generation that is expected to walk or bike to the project site. The additional non-motorized trips generated by the visitor learning center are not anticipated to degrade any existing facilities.

### **3.2.10 Safety Impacts**

Since the level of incremental added traffic associated with the visitor learning center (Table 3.2-1) and retail space (Table 3.2-2) are very low, no noticeable change in off-site safety is anticipated.

### **3.2.11 Parking Impacts**

#### **Code Requirements**

The City of Seattle Land Use Code requires the provision of one parking stall per 250 square-foot of museum public exhibit space, and one parking stall per 350 square-foot of retail space. In addition, the code exempts the first 2,500 square-foot of non-residential use for certain uses including retail. For the purposes of this analysis, it is assumed that the visitor learning center would have approximately 16,000 square feet of public exhibit space and approximately 10,000 square feet of accessory office space. Based on the code requirements, the proposed visitor learning center exhibit space of 16,000 square-feet would require the provision of 64 parking stalls to meet parking code. The 10,000 square-foot retail space, after applying the 2,500 square foot exemption, would require 21 spaces. These uses would revise the parking allocation shown above in Table 3.1-2 to replace the 30 spaces allocated to the “Customer Service Center” with 64 spaces allocated to the “Visitor Learning Center” and 21 spaces allocated to “Retail” in the Fifth Avenue garage. The Land Use Code requirement of 64 spaces for the potential visitor learning center plus 21 spaces for the potential retail use has been reduced by applying a reduction of 20% for cooperative parking reduction (17 spaces), and then further reduced by another 20% (14 spaces) for the Title 23 transit reduction, resulting in a provision of 54 spaces. The revisions are shown below in Table 3.2-4

**Table 3.2-4**

**Seattle Center Stall Requirements by Facility Amended to Replace the BMGF Customer Service Center with the Visitor Learning Center and Retail**

Facility	Parking Requirement	Facility	Parking Requirement
Mercer Arena	33	Fun Forest Restaurant	6
New Seattle Center Pavilion	163	Fun Forest Shop	2
ATM Kiosks		Fun Forest Pavilion	35
Bagley Wright Theater	107	Fun Forest Game Line	9
Bagley Wright – Second Stage	46	Fun Forest Gift Shop	3
Bagley Wright Poncho Forum	17	KCTS Studios	30
Blue Spruce Building	9	Monorail Offices	4
Center House Armory		Northwest Rooms	307
– sub-basement	3	Northwest Craft Center	4
– basement	12	McCaw Hall	369
– First Floor office/retail	12	McCaw Hall Lecture Hall	40
–Children’s Museum	88	New Central Plant	5
–Group Theater	41	Seattle Center Shops	9
–Food Court Level	269	Intiman Playhouse	53
–Balcony Level	26	Pottery Northwest	3
–Conference Center	0	Seattle Children’s Theater	140
– Fourth Floor	46	Sonics Practice Facility	64
New Seattle Center Coliseum	1719	Space Needle 100 Level	13
Experience Music Project	200	Warehouse	18
EMP New Exhibit Space	84	Westcourt Building	11
Exhibition Hall	400	Center House Restaurant Dining Terrace	5
Phelps Center	32.5	Fisher Pavilion	147
		<b>Subtotal</b>	<b>4581</b>
		<b>New Fifth Avenue Garage<sup>16</sup></b>	
		Parking Office	5
		Visitor Learning Center	64
		Retail	21
		<b>TOTAL STALLS REQUIRED</b>	<b>4671</b>
		Title 23 Coop. Parking Reduction (20%)	–934
		Subtotal	3737
		Title 23 Transit Reduction (20%)	–747
		<b>TOTAL TITLE 23 REQUIRED PARKING (REVISED)</b>	<b>2990</b>

This change in use from “Customer Service Center” to “Visitor Learning Center” and “Retail” results in the following revision to Table 3.1-3 Seattle Center Parking Supply provided above in Section 3.1:

**Table 3.2-5  
Revised Seattle Center Parking Supply**

Parking Area	Number of Spaces
--------------	------------------

<sup>16</sup> Seattle Center parking stall requirements as shown on the Master Use Permit Application for the new Fifth Avenue Garage.

Mercer Street Garage	1439
Fifth Avenue Garage	1038
First Avenue North Garage	654
New Lot #6 (west of Intiman Theater)	22
South Coliseum Lot	70
North of Bagley Wright	25
Adjacent to South Side of Opera House	2
North of Center House	2
KCTS Parking	4
Sonics Practice Facility	48
Westcourt Building (Sonics Team Shop)	10
<b>TOTAL PARKING SUPPLY</b>	<b>3314</b>
Total Title 23 Required Parking	2990
<b>Surplus Code Required Parking (Revised)</b>	<b>324</b>

### Parking Demand

Parking demand for the visitor learning center and retail spaces were calculated considering the size, typical employee density, attendance, daily occupancy, and travel mode split of the proposed uses. Calculation worksheets for the parking demand analysis are provided in Appendix C. Peak parking demand for the visitor learning center and retail spaces would total 18 parking stalls.

Based on the trip generation estimates provided above, it is anticipated that the provision of 54 parking stalls for the proposed museum and retail use would exceed anticipated peak parking demand on a typical day.

#### 3.2.12 Mitigation Measures

No impacts have been identified for the visitor learning center and retail space, and mitigation measures are not required.

### **3.3 Construction Impacts**

#### **3.3.1 Air Quality**

During construction, dust resulting from excavation and grading would increase concentrations of suspended particulate matter. The construction contractor would have to comply with the Puget Sound Clean Air Agency regulations requiring that reasonable precautions be taken to avoid dust emissions. This could include applying water or dust-binding chemicals during dry weather.

Construction activities would include the use of heavy trucks and smaller equipment such as generators and compressors. These engines would emit air pollutants that would contribute slightly to the degradation of local air quality, however emissions from existing sources in the project area (primarily from traffic) would likely exceed construction equipment emissions. If asphalt paving is used, hydrocarbon emissions from the hot asphalt would be released during paving.

#### **Mitigating Measures**

- Emissions from construction equipment and trucks would be reduced by using new and/or well-maintained equipment. Avoiding prolonged periods of vehicle idling and engine-powered equipment would also reduce emissions.
- Trucking of material to and from the construction areas would be controlled to minimize traffic congestion during peak travel times. This would minimize secondary air quality impacts caused by reduced travel speeds.
- Dust produced by construction activities could be reduced by spraying areas of exposed soils and construction roadways with water or dust suppressants. Areas that may be exposed for prolonged periods of time can be paved, planted with a vegetation ground cover, or covered with tarps or gravel.
- The amount of soil carried out of the construction area by exiting trucks can be minimized by wheel washing and by covering dusty truck loads.
- Soil that is carried out of the construction area on existing vehicles can be reduced with an effective street-cleaning effort.

#### **3.3.2 Noise**

During each phase of construction, there would be a temporary increase in sound levels near the site due to the use of heavy equipment and the transportation of construction materials. Table 3.3-1 identifies a general range of noise levels generated by various phases of construction. The range of sound levels reflects the fact that construction work is highly variable. Equipment may not operate or may idle for long periods of time, depending on the construction phasing. At some point, however, all the equipment may operate simultaneously, generating sound levels at the high end of the range.

**Table 3.3-1**  
**Typical Noise Levels at a Construction Site (dBA)**

Activity	Range of Sound Levels	
	All Construction Equipment Operating	Minimum Required Equipment Operating
Ground Clearing	84	84
Excavation	88	78
Foundations	88	88
Erection	79	78
Finishing	84	84

Source: U.S. Environmental Protection Agency, 1971.

Table 3.3-2 displays a range of sound levels associated with equipment likely to be used during the construction of the new buildings. Construction would require concrete mixing and pumping; cutting and drilling of wood, stone, concrete and metal; welding; and the use of compression and cranes.

**Table 3.3-2**  
**Typical Construction Equipment Noise (dBA)**

	Types of Equipment	Range of Noise Levels at 50 Feet
Materials Handling	Concrete mixers	75-87
	Concrete pumps	81-83
	Cranes (movable)	76-87
	Cranes (derrick)	86-88
Stationary Equipment	Pumps	69-71
	Generators	71-82
	Compressors	74-87
Impact Equipment	Pneumatic wrenches	83-88
	Rock drills	81-98

Source: U.S. Environmental Protection Agency, 1971.

Washington Department of Ecology and Seattle noise regulations would apply to construction noise. The Ecology property-line noise regulations provide that no person shall cause or permit noise to intrude into the property of another person if the noise exceeds the maximum permissible noise levels. Ecology's maximum permissible noise levels are presented in Table 3.3-3.



**Table 3.3-3  
Ecology Maximum Permissible Noise Levels (dBA)**

EDNA of Noise Source	EDNA of Receiving Property			
	Class A (Residential) Daytime 7 AM – 10 PM	Class A (Residential) Nighttime 10 PM – 7 AM	Class B (Commercial)	Class C (Industrial)
Class A (Residential)	55	45	57	60
Class B (Commercial)	57	47	60	65
Class C (Industrial)	60	50	65	70

EDNA = Environmental Designation for Noise Abatement

Source: WAC Chapter 173-60

The property-line noise regulations in Table 3.3-3 depend on the land uses of both the source of a sound and the receiving property, and on the time of day. The environmental designation for noise abatement (EDNA) of a property considers its usage or zoning designation. In general, the Class A EDNA includes residential zones, Class B EDNA includes commercial zones, and Class C EDNA includes industrial zones.

Construction noise must meet the Seattle and Ecology requirements. Daytime construction noise generally is exempt. In Seattle, construction noise could be considered a potential nuisance between 10 PM and 7 AM on weekdays and between 10 PM and 9 AM on weekends and legal holidays. The Ecology property-line noise regulations in Table 3.2-3 apply to construction noise only during nighttime (10 PM to 7 AM) at residential receiving properties (Class A EDNA). Construction would occur only during daytime hours and would comply with the relevant sections of the Seattle noise ordinance.

Because of the proximity of the site to both single-family and multi-family residential units on lower Queen Anne Hill, the hours of construction activities should be limited to minimize disruption during the evening hours.

### **Mitigating Measures**

- To reduce the noise impact of construction on nearby properties, construction activities other than in totally enclosed floors should be limited to non-holiday weekdays between 7:30 A.M. and 6:00 P.M. and Saturdays from 9:00 A.M. to 5:00 P.M. Work outside these times should only be allowed if undertaken within the specific context of a noise-mitigation plan submitted to DPD and approved by the DPD planner.
- Construction noise can be mitigation with the use of properly sized and maintained mufflers, engine intake silencers, and engine enclosures; by turning off equipment when not in use; and confining activities to daytime hours.

### 3.3.3 Transportation

#### Alternative 2a

Construction of the *Alternative 2a* initial phase, beginning in the first or second quarter of 2008, would generate truck and vehicle traffic associated with earthwork and excavation, delivery of materials to the site and similar types of activities. The highest concentration of truck traffic expected to occur during construction would coincide with the earthwork and excavation activities. Preliminary estimates indicate that approximately 150,000 to 190,000 cubic yards of material would be removed in conjunction with initial phase development. This is estimated to generate approximately 15,000 truck trips over an eight to sixteen week time frame. Given the estimated construction schedule, the amount of traffic would equate to between 200 and 400 trips per day, depending upon the number of weeks and the number of days per week which excavation would occur. Truck traffic would be substantially less during the remaining periods of construction.

Construction of the *Alternative 2a* build-out, beginning beyond 2010, would generate truck and vehicle traffic associated with earthwork and excavation, delivery of materials to the site and similar types of activities. The highest concentration of truck traffic expected to occur during construction would coincide with the earthwork and excavation activities. At this time it is not known how much material would be removed in conjunction with *Alternative 2a* build-out. However, the amount of traffic associated with construction, is expected to be less than the total development related traffic volumes anticipated.

#### Alternative 3a

Construction impacts associated with the *Alternatives 3* build-out are anticipated to be similar to *Alternative 2a* build-out, although would likely be slightly lower.

#### Alternative 4

Construction impacts associated with the *Alternatives 4* build-out are anticipated to be similar to *Alternative 2a* build-out, although would likely be slightly lower.

#### Visitor Learning Center/Retail

If constructed, the visitor learning center and retail space would be completed as part of the construction of the Seattle Center Garage. The additional construction impacts associated with the visitor learning center would be minimal relative to the construction impacts associated with the Seattle Center Garage.

#### Mitigating Measures

The owner(s) and/or responsible party(s) shall secure DPD Land Use Division approval of construction phase transportation and pedestrian circulation plans. These plans should consider impacts during any demolitions and during construction of the building. The plans shall address the following:

- Ingress/egress of construction equipment and trucks.
- Truck access routes, to and from the site, for the excavation and construction phases.

- Potential temporary displacement/relocation of any nearby bus stops.
- Information to be posted to provide drivers and pedestrians with advance notice of traffic lane or sidewalk closures, including locations of re-routing pedestrian movements.
- Provision of safe pedestrian and vehicular circulation adjacent to the construction site through the use of temporary sidewalks, signs and manual traffic control (flaggers).
- Regular sweeping and washing operations on streets adjacent to the site
- Impacts and mitigation of trips associated with construction and/or demolition activities during major events at Seattle Center.

## 4.0 Comments and Response to Comments on DEIS

### 4.1 Public Hearings

On April 27, 2006, the City of Seattle Department of Planning and Development (DPD) issued a Draft Environmental Impact Statement (DEIS) for the proposed 500 Fifth Avenue North project. The issuance of the DEIS was followed by a 42 day agency and public review period which ended on June 9, 2006. During the review period, DPD conducted two public hearings, on May 9, 2006 at 6:30 p.m. and on June 7, 2006 at 5:30 pm. Both hearings were held in Room 1 of the Queen Anne Community Center, 1901 First Avenue West, Seattle, Washington. Due to the small number of attendees, both public hearings were conducted in a question and answer format. No written comments were received from attendees at either hearing.

The May 9 hearing was attended by the following members of the public:

- Brett Percy, P.O. Box 9671, Seattle, WA 98109, real estate sales for the Lumen residential/commercial project located on the northeast corner of Fifth Avenue North and Mercer Street.
- Katie Hess, 1941 Gilman Drive W., Seattle, WA 98119, real estate sales for the Lumen residential/commercial project located on the northeast corner of Fifth Avenue North and Mercer Street.
- Carrie DeBuys, 2605 Franklin Avenue E., #E, Seattle, WA 98102, real estate sales for the Lumen residential/commercial project located on the northeast corner of Fifth Avenue North and Mercer Street.
- Darryl Benge, 330 6<sup>th</sup> Avenue N., Seattle, WA 98109, from the Experience Music Project.
- Richard and Donna Adler, 333 Taylor Avenue N., Seattle, WA 98109, property owners to the south of Harrison Street.

The oral comments, questions and responses discussed at the May 9 hearing include the following:

1. What will be the height of the buildings? Response: 85 feet
2. Will the campus include a central plant? Response: The campus will be constructed in phases, and no decision has been made as to whether a central plant will be used. The Bill & Melinda Gates Foundation is concerned about the appearance of mechanical apparatus on building rooftops and is working to eliminate or minimize them.
3. What will be the setback from Mercer? Response: 80 feet, or 160 feet from the Lumen project when the width of Mercer Street is included in the measurement.
4. Does the EIS include a discussion of the 5th and Harrison sidewalk improvements? Response: The improvements are being done as part of the garage project, not as a result of the campus project.
5. Does the EIS discuss where replacement parking will be for large vehicles (buses, trucks) that currently use the surface lot? Response: Seattle Center is addressing this need.

6. There are currently some safety issues with the existing vegetation (places for criminal activities).
7. Will the campus would include other uses besides the Gates Foundation, and will there be retail along 5th Avenue? Response: The campus would be used entirely for the foundation with no general public access. The garage would have a coffee cart and perhaps some retail use. In addition, there is currently a Visitor Learning Center proposed for the north end of the garage building.
8. Existing utilities - will they be under-grounded? Response: The existing high power transmission lines will be moved to Broad Street and then along 6th Avenue and they will remain above ground. The lower power distribution lines will be undergrounded.
9. What will be the timing of the construction of the garage and the campus? Response: The garage would be constructed first, during 2007, and the campus construction would not start until after the garage was completed as the garage is the replacement for the existing parking. The campus would be constructed in phases, with the initial phase focused toward the corner of Mercer and 5th Avenue.
10. What is the location of the garage and its access points? Will the garage extend from 5th Avenue over to Broad? Response: The garage is located at the southeast corner of Fifth Avenue North and Harrison Street; it does not extend to Broad Street (see Figure 1-1 of DEIS). Garage access would be from Harrison and Republican Streets.
11. The Adlers expressed concern about traffic impacts and access to their site, and noise and vibration during construction. Specific concern was raised about routing of construction trucks and whether the DEIS addressed the routes and impacts. Response: A construction truck routing plan would be prepared as part of a transportation management plan and would be subject to approval by SDOT.
12. The Adlers cited personal experience in driving to their building from the north along Broad Street and how far traffic backs up during the day. They were concerned that the DEIS focused too narrowly on the site. Response: The Adlers were shown figures in the traffic section of the DEIS indicating that the traffic analysis considered traffic over a much larger area.

The June 7, 2006 hearing was attended by the following member of the public:

- Sun Choy, 11010 NE 8<sup>th</sup>, Suite 465, Bellevue, WA 98004, owner of Hampton Inn and Comfort Suites, Seattle Business Center, and property located at the northeast corner of Taylor Avenue North and Mercer Street.

Mr. Choy's question was whether Mercer Street would be widened as he is seeking a rezone of his property at Taylor Avenue North and Mercer to increase the height limit to 60 – 65 feet (currently at 45 feet). The response provided was that the Mercer Street widening is dependent on the Alaskan Way Viaduct project, the widening is not part of the project, and the funding has not yet been obtained. (See SDOT comment letter and responses for additional information.)

## **4.2 Written Comments**

Two written comment letters were received during the DEIS comment period, from the Seattle Department of Transportation and from the King County Department of Transportation, MetroTransit Division. The comment letters and responses begin on the next page.



Seattle Department of Transportation

Gregory J. Nickels, Mayor

Grace Crunican, Director

33757657-1.indd

## MEMORANDUM

**DATE:** June 8, 2006  
**TO:** Molly Hurley, DPD Planner  
**FROM:** Urania Perez, SDOT Senior Environmental Analyst  
**SUBJECT:** DEIS for Bill & Melinda Gates Foundation Campus – Project # 3003599

Thank you for the opportunity to provide comments on the DEIS for the project mentioned above. I circulated the DEIS to several divisions in SDOT and below are the consolidated comments organized by general comments and specific comments. SDOT's main concern is potential impacts to the transportation network.

### General Comments

Proposed SDOT Transportation Projects - The future transportation project descriptions and references to these projects throughout the document should clearly distinguish between the specific projects as they are being assessed under SEPA and NEPA. The Mercer Corridor Project limits are from Fairview Ave N to Dexter Ave N. It includes an option to connect to the existing street network, including the Broad Street underpass, between Ninth and Dexter Avenues and an option to connect to the proposed street network that is part of the Alaskan Way Viaduct and Seawall Replacement Project (AWVSR). Widening of Mercer Street west of Dexter Avenue North is part of the AWVSR Project, along with the "Aurora Avenue Improvements" and the "Reconnection of Street Grid." There are two alternatives for the Aurora Improvements (including two-way Mercer and Sixth Avenue): Lowered Aurora and Partially Lowered Aurora.

Timing of the Mercer Corridor Project - SDOT is proceeding with Design while completing a NEPA Environmental Assessment for the Mercer Corridor Project, and expects to complete the environmental documentation by the end of 2006. We plan to begin construction in 2008, if funding is available.

Page vi, Air Quality: According to the DEIS, this was not reviewed for impacts from operation since the proposal was not expected to impact air quality. However, the large number of vehicles expected to access the garage and the site combined with the heavy traffic in the area will contribute to reduced air quality and should be evaluated for impacts and mitigation. This might include traffic flow improvements on Mercer and other surrounding streets.

Page xi –Other Governments Services/Utilities: This table indicates that during phase 1, transmission lies along Broad Street may be undergrounded between 6<sup>th</sup> and Republican. The City of Seattle is currently undertaking planning and design of major changes to the transportation grid in relationship to the Aurora Avenue corridor and physical changes to Broad Street. Undergrounding of this area should be coordinated to eliminate future infrastructure relocation costs.

### SDOT-1

### SDOT-2

### SDOT-3

### SDOT-4

## SDOT-1

**Response:** Sections 1.3 and 2.4 have been revised as follows:

### 1.3 Potential for Future Improvements to Area Roadways

There are improvement projects that are proposed for nearby roadways that could affect the design or traffic from the project:

- Mercer Corridor Project from Fairview Avenue North to Dexter Avenue North, proposed by the Seattle Department of Transportation (SDOT)
- Alaskan Way Viaduct and Seawall Replacement Project (AWVSR), proposed by the Washington Department of Transportation (WSDOT)

If funding is available for these projects and construction proceeds, changes could be made to nearby roadways: (1) adjacent to the project site on Mercer Street between Fifth Avenue North and Dexter Avenue North; (2) Aurora Avenue North; and (3) Sixth Avenue North.

### 1.3.1 Mercer Corridor Project (Fairview Avenue North to Dexter Avenue North)

The Mercer Corridor Project limits are from Fairview Ave N to Dexter Ave N. The Mercer Street improvements call for the conversion of Mercer Street from one-way to two-way operations, with the provision of three-travel lanes in each direction and additional turn lanes at intersections. The project includes an option to connect to the existing street network, including the Broad Street underpass, between Ninth and Dexter Avenues and an option to connect to the proposed street network that is part of the Alaskan Way Viaduct and Seawall Replacement Project (AWVSR).

SDOT is proceeding with design while completing a NEPA Environmental Assessment for the Mercer Corridor Project, and expects to complete the environmental documentation by the end of 2006. The design is expected to be completed to the 60% level by the end of 2006. SDOT plans to advertise the project for construction in August of 2008, and begin construction in late 2008, if funding is available.





### 1.3.2 Alaskan Way Viaduct and Seawall Replacement Project (AWVSR)

WSDOT and the Federal Highway Administration (FHWA) are working to replace the existing Alaskan Way Viaduct and Seawall. The project is in environmental review and design for two alternatives, a tunnel option and an elevated structure. Construction would begin in 2009, assuming funding is available.

With both alternatives, improvements would be made to the Battery Street tunnel, and Mercer Street would be widened from four lanes to a seven-lane, two-way roadway between Fifth and Ninth Avenues. If implemented, the widening of Mercer Street would require up to 50 feet in additional setback from the existing roadway along the northern boundary of the project site.

In addition to widening of Mercer Street west of Dexter Avenue North, the proposed AWVSR Project includes two alternatives for improvements to Aurora Avenue North: Lowered Aurora and Partially Lowered Aurora. The Aurora Avenue improvements would close Broad Street between Fifth and Ninth Avenues, close the ramps at Broad Street and Mercer Street, reconfigure access to/from Aurora Avenue to the north of the Battery Street tunnel, and reconnect the street grid in certain areas.

The current proposal would lower Aurora Avenue between Roy Street and Denny Way, and would reconnect several streets across Aurora Avenue, including Harrison Street, Thomas Street, and possibly Republican Street. In addition, the connections between Aurora Avenue and the surface street network would be modified to consolidate access points at Roy Street and Republican Street. Currently included in the reconnection of the streets across Aurora Avenue is the reconnection of Sixth Avenue between Roy Street and Harrison Street, through the proposed project site.

#### SDOT-2

**Response:** See response to SDOT-1 above. The EIS text has been revised to include this information.

#### SDOT-3

**Response:** Per Seattle Municipal Code 25.05.402, EISs need analyze only probable adverse environmental impacts that are significant. Traffic is considered a mobile source for air quality and no comments were received during scoping to indicate that the air quality impacts from increased traffic would be considered a significant impact.

Pages 1-1 & 2-2, Sections 1.1 & 2.1 Sponsor's Objectives: These sections indicate that one of the sponsor's objective is to create a "secure campus environment, without public streets and public walkways though the project site." This objective creates a major impediment to pedestrian movement through the project site and conflict with the City's goals of trying to re-establish the transportation grid across Aurora Avenue North and in the South Queen Anne/South Lake Union area.

The surface water section should reference the Seattle Storm Water code. Onsite storm water may be required due to the replacement of impervious area. Why is Water quality, in general, not even addressed?

#### Specific Comments

Pages 1-3 and 2-4, Sections 1.3 & 2.4 Potential for Future Improvements to Area Roadways: The DEIS indicates that the Mercer Corridor Improvements has not finalized funding. However, funding for design is available and a consultant has been selected. Design is proceeding and expected to be at 60% by the end of 2006 with advertisement expected in August 2008.

Chapter 1 and Chapter 2: The SDOT project descriptions in this section should be re-organized to describe the specific projects as they are being assessed under SEPA and NEPA. The Mercer Corridor Project limits are from Fairview Ave N to Dexter Ave N. Widening of Mercer Street west of Dexter Avenue North is part of the Alaskan Way Viaduct and Seawall Replacement Project (AWVSR), along with the "Aurora Avenue Improvements" and the "Reconnection of Street Grid." Both projects are completing environmental review under NEPA and SEPA. Contact Steve Pearce at 206-684-8371 if you have any questions about the AWVSR Project, and Eric Tweit at 206-684-8834, if you have questions about the Mercer Corridor Project.

Page 1-4, Section 1-3: Under "additional access" points, the statement about Roy and Republican are not accurate. Rephrase to state that access points are consolidated to Roy and Republican (this statement repeats in Section 2-4).

Pages 1-4 and 2-4 through 2-10, Section 1.4.X Alternatives Analysis (1, 2 & 3) and Section 2.6 through 2.8: Each of these alternatives assumes that Mercer Street will not be rebuilt, or widen; in fact, the City is proceeding with design and anticipates building the Mercer Corridor Improvements between Fairview and Dexter. Each of the alternatives should assume the Mercer Corridor Improvement project proceeds. Why is there not an alternative with higher density (1,000,000 square feet) with 6<sup>th</sup> Avenue N Improvements?

Pages 1-6 & 2-5, Sections 1.3 and 2.7 -Table 1-1: The DEIS indicates the Mercer Street Improvements would require 50 feet of additional setback from the roadway; however in Table 1-1 and Section 2.7 it indicates Alternative 2 as only setback 30 feet from the existing curb line, while alternatives 3 and 4 are 80 feet back. It would seem that Alternative 2 also needs the 80 foot setback from Mercer Street Curb Line to accommodate the future widening of Mercer Street. Widening of the section between Dexter and Fifth is not necessarily dependent on Lowered Aurora or Partially Lowered Aurora. Clarify.

Pages 1-6 & 2-11, Sections 1.4.5 & 2.10: The DEIS is somewhat confusing here - it indicates that the Center and Retail Space will be located along the 5<sup>th</sup> Avenue N portion of the garage; while in Section 1.4 it stated that the garage will undergo a separate environmental review. Since the two facilities are critical to one another it is important to evaluate the potential *cumulative* significant impacts within the context of both projects at one time.

#### SDOT-5

#### SDOT-6

#### SDOT-7

#### SDOT-8

#### SDOT-9

#### SDOT-10

#### SDOT-11

#### SDOT-12

Within the region, motor vehicles are the dominant source of criteria pollutants. Based on the 1998 emission levels, obtained from the Puget Sound Clean Air Agency, automobiles contribute about 57 percent of the carbon monoxide (CO) released to the atmosphere in the Puget Sound Region. Despite the population growth, the CO levels in the region have been declining over the last two decades due to increasingly stringent state motor vehicle inspection and maintenance programs, cleaner burning fuels and technological and engineering improvements to engine performance.

#### SDOT-4

**Response:** DPD agrees that undergrounding of this area should be coordinated and suggests that SDOT work with Seattle City Light on planning for projects that may affect transmission lines in this area.

#### SDOT-5

**Response:** The site is currently contiguous without public streets or public walkways through the project site so the sponsor's objective would not change the existing condition. Both Republican Street and Sixth Avenue North were vacated by the City. As a private property, the property owner has the right to limit public access. Should Sixth Avenue North be re-established through the project site by the City, the transportation grid and pedestrian movement would be recreated.

#### SDOT-6

**Response:** Per Seattle Municipal Code 25.05.402, EISs need analyze only probable adverse environmental impacts that are significant. The site is currently a paved surface parking lot. The proposed stormwater controls (as part of the grading and drainage permit) will improve the quality of the water runoff.

#### Specific Comments

#### SDOT-7

**Response:** See response to SDOT-1 above. Text has been revised as requested.

#### SDOT-8

**Response:** See response to SDOT-1 above. Text has been revised as requested.

#### SDOT-9

**Response:** See response to SDOT-1 above. Text has been revised as requested.

## SDOT-10

**Response:** See response to SDOT-1 above. The City's project would widen Mercer Street between Fairview Avenue North and Dexter Avenue North, which is the segment of Mercer Street located approximately one block east of the project site. Widening Mercer Street east of Dexter Avenue North would not affect the project design. Alternatives 1, 2 and 3 assume no improvements to Mercer Street west of Dexter Avenue North along the northern boundary of the project site. The descriptions of alternatives have been revised to clarify this:

- No improvements made to Mercer Street between Fifth Avenue North and Dexter Avenue North, Aurora Avenue North, or Sixth Avenue North

The traffic impacts of a 1 million square foot alternative have been analyzed in the DEIS. If the applicant determines that 1 million square feet of office space could be accommodated on the site with Sixth Avenue North improvements, DPD will review the EIS to determine whether any additional impacts would be created that were not already analyzed.

## SDOT-11

**Response:** See SDOT comment and response to SDOT-1. Per SDOT's comment, it is our understanding that widening of Mercer Street between Dexter and Fifth Avenue North is part of the AWVSR project and would be dependent upon a revised Aurora Avenue and the availability of funding. At this point there is not a City project to widen Mercer Street on the northern boundary of the site. The applicant's proposal, as part of all Alternatives, to set the project back 80 feet from the existing curb line along Mercer Street is voluntary.

## SDOT-12

**Response:** As stated on page iv of the EIS under "Other Actions in the Site Vicinity", a Master Use Permit has been issued for the future construction of a parking garage for 1,050 vehicles, 4,000 square feet of office for parking management, and 10,500 square feet of customer service office. The garage will be owned and operated by the Seattle Center. The environmental review for the garage (including the 4,000 square feet of office and 10,500 square feet of customer service office) has been completed. The cumulative impacts of the garage with the campus construction have been considered in that the garage construction and operation were assumed as part of background conditions for all alternatives, and is listed as "New Seattle Center garage is complete and operational" under each description of the Action Alternatives (see pages 1-4, 1-5 2-5, 2-7 and 2-9).

With each action alternative for the campus, a visitor learning center and retail space may be constructed on the north end of the garage. The visitor learning center would be approximately 26,000 square feet and the retail would be approximately 10,000 square feet. The visitor learning center would replace the 10,500 square foot customer service office. The increase in size is subject to SEPA and the potential impacts are being considered both in this EIS as part of the campus development, and in a separate SEPA review for the Master Use Permit for the change to the garage.

Page 1-7, Table 1-2: According to this table (2010 Initial Phase), no impacts are based on traffic volume increase of up to 3,635 daily trips and 565 to 635 peak hour trips when it discloses 9 intersections levels of service degrade with 3 of them reaching LOS E. This gets progressively worse at Build Out (2025). Mitigation is needed to ensure an effective transportation system. For areas within the South Lake Union Transportation Study area, mitigation should be consistent with the recommendations of the Study. Mitigation should also include improvements to transit, bicycling and walking as alternatives to single occupancy vehicle travel. According to the table (2010 Initial Phase), no impacts are anticipated based on site access. On the contrary, with 565 to 635 vehicle trips during the peak hours and 3,635 daily trips it would seem that site access may spill into the street system and block surrounding traffic operations. This is a significant impact to traffic operations and should be mitigated.

#### SDOT-13

Page 1-8, Table 1-2: At Build Out (2025) the table indicates that Site Access has no impacts. In fact, it discloses 5,600 daily trips and 985 to 1,050 peak hour trips. Again these vehicle trips have significant potential to spill into the street system and block surrounding traffic operations. As such these are significant impacts and should be mitigated.

#### SDOT-14

Page 1-9, Table 1-2: Construction related impacts on the transportation system (such as haul routes) should be detailed. This table also indicates that the phasing of future work is not yet known so we would anticipate future environmental documentation will be produced for comment on these future phases which are not yet disclosed.

#### SDOT-15

Page 1-9, Table 1-2: The City is proceeding with several projects which are currently under design and will be in construction by 2008. Will the timing of this project's construction impact the construction and sequencing of the Mercer Corridor project. Coordination will be required to lessen the impact on both projects.

#### SDOT-16

Page 1-10, Table 1-3: Transportation – it is good that DEIS indicates that the project proponent would participate in the South Lake Union Transportation Plan. Any solutions to impacts attributable to the proponent's project should be proportionately funded by the proponent.

#### SDOT-17

Page 1-10, Table 1-3, Transportation – Optimization of signal timing: It is important to understand that the South Lake Union area is a system of signals and optimization of all signals may be required to ensure efficient traffic progression. If this can not be achieved then physical improvements beyond a single signal's optimization may be necessary.

#### SDOT-18

Page 1-10, Table 1-3: Construction Transportation – the potential mitigation measures should include coordination with the City to lessen impacts during construction activities of the Mercer Corridor Improvement project.

#### SDOT-19

Page 2-9, Section 2.9: The DEIS indicates that funding and a construction schedule have not been established, in fact they have, see comment on Potential for Future Area Roadway Improvements above.

#### SDOT-20

Page 2-10, Figure 2-4: This figure indicates a bridge at Republican and it is not clear what happens at Harrison Street. The Republican bridge should be labeled as "possible" (depending on which option is chosen).

#### SDOT-21

Page 3-4, Section 3.1.1: Affected Environment The Pedestrian and Bicycle sections should note that Aurora Avenue North (SR 99), on the east border of the project site, is a major barrier to bicycle and pedestrian travel. This could be a limiting factor to the success of travel demand management programs that encourage bicycling and walking.

#### SDOT-22

### SDOT-13

**Response:** Mitigation measures include participation in the South Lake Union Transportation Plan to mitigate traffic impacts and a Transportation Management Program aimed at lessening the dependence of campus staff on single occupancy vehicles. (See pages 1-10 and 3-32). The impacts on site access have been considered (see pages 3-17 and 3-18) and the LOS analysis performed showing that during both the AM and PM peak hours, each driveway would operate at LOS C or better. LOS C operations do not require mitigation. In addition, a queuing analysis was conducted to document the impact of project traffic volumes along the roadways in the immediate vicinity of the project site (Appendix A, page 42).

On page 1-7, Table 1-2, "Traffic Volumes", column under "Alternative 2", the phrase "No Impacts" has been replaced by "Impacts evaluated below."

### SDOT-14

**Response:** See page 3-27, "Site Access". A LOS analysis was conducted for each site access intersection showing that the intersections are estimated to operate at LOS C or better during both the AM and PM peak hours. The results indicate that the site access intersections would provide adequate capacity. In addition, a queuing analysis was conducted to document the impact of project traffic volumes along the roadways in the immediate vicinity of the project site (Appendix A, page 67).

### SDOT-15

**Response:** See pages 1-10 and 3-43. The applicant will be required to submit and obtain approval of a construction phase transportation and pedestrian circulation plan prior to construction. This plan will include the review and approval of haul routes. The text has been revised to include consultation with SDOT prior to DPD approval. Each subsequent Master Use Permit (MUP) for construction of future phases will include the requirement for a new construction phase transportation and pedestrian circulation plan specific to the proposed construction covered by the MUP.

### SDOT-16

**Response:** See response SDOT-15 above. SDOT will be consulted in the review of the applicant's construction phase transportation and pedestrian circulation plan prior to construction and will have the ability to consider potential impacts to the construction and sequencing of the Mercer Corridor project east of Dexter Avenue North.

### SDOT-17

**Response:** Comment noted.

### SDOT-18

**Response:** Comment noted. Optimization of signal timing is proposed for the intersection of Fairview Avenue North and Denny Way and would require SDOT approval.

**SDOT-19**

**Response:** See response to SDOT-15 and SDOT-16.

**SDOT-20**

**Response:** See response to SDOT-1. Funding for the design phase and construction schedules have been established for the SDOT proposed Mercer Corridor Project east of Dexter Avenue North. Development of the campus under Alternative 4 would be affected by the AWVSR Project which does not have funding or a construction schedule for the area immediately adjacent to the campus.

**SDOT-21**

**Response:** The bridge across Aurora Avenue, depicted on Figure 2-4, would not be constructed as part of the project. It would be part of the AWVSR project if constructed. The words "AWVSR Project Possible Bridge" have been added to the figure.

**SDOT-22**

**Response:** The text on page 3-4 has been revised as suggested.

Pedestrian Facilities

Pedestrian facilities consist primarily of 5- to 8-foot-wide sidewalks along both sides of the streets within the study area. Each of the signalized study intersections includes pedestrian crosswalks, push buttons, and signal heads to facilitate pedestrian travel. Aurora Avenue North (SR 99), on the east border of the project site, is a major barrier to pedestrian travel.

Bicycle Facilities

Based on the *Seattle Bicycling Guide Map* (published by SDOT) there are dedicated bicycle lanes along Dexter Avenue North. With the exception of Dexter Avenue North, bicyclists typically use the vehicle travel lanes for travel in this area. Aurora Avenue North (SR 99), on the east border of the project site, is a major barrier to bicycle travel.



Page 3-8, Section 3.1.2: Mercer Corridor Project is identified as in the EIS phase evaluating options, actually it is in an EA process and all options (except the no action alternative) showing to widen Mercer Street and convert it to a 2-way facility.

Page 3-11, Section 3.1.2: Alternative 2 Initial Phase – Street System: The DEIS indicates no off-site modifications to street channelization or intersection control are proposed. Based on site and traffic volume characteristics I would anticipate improvements would be needed to ensure that vehicles entering into the development do not impact traffic operations on surrounding streets. This may require curb line, channelization or intersection control improvements to mitigate these localized impacts.

Page 3-13, Figure 3-1: This figure indicates that 35 to 40% of the inbound traffic will use Mercer; the impacts of this traffic should be evaluated in relation to the Mercer Corridor Improvements.

Page 3-14, Figure 3-2: This figure indicates that 50% of the outbound vehicles will use Mercer and at least 40% will be using the Mercer Corridor Improvements. Impacts of this traffic should be evaluated.

Pages 3-19 & 3-20: The DEIS indicates that under Alternative 2, 3 and 4 there would be a deficit of 304 to 605 stalls. It may be inappropriate to assume that all of the surplus off-street spaces in nearby facilities would be available for commuter parking or that they will be available for the entire life of the proponent's project. Understanding that some of the parking deficit estimates assume a Moderate to Aggressive Traffic Management Plan (TMP), it would be appropriate to support on-site bicycle facilities to meet DEIS assumptions. Parking Demand: Meeting required parking demand should not depend on surrounding off-site off-street parking unless agreements are in place to guarantee parking requirements are met. SDOT would suggest a monitoring program to ensure the development can manage its parking, as well as an aggressive TMP to ensure less demand for parking.

Page 3-20, Alternative 4 –Initial Phase: As in previous comments, the City intends to proceed with Mercer Corridor Improvements and be in construction in 2008.

Page 3-22 Section 3.1.3, Alt 1 Non-Motorized Facilities – As Alternative 1 is defined, with no improvements on Aurora, Aurora will continue to be a barrier to pedestrian and bicycle travel and may be a limiting factor to accommodating increased demand.

Page 3-23, Alt 2-3, Build Out: As mentioned in an earlier comment – the DEIS indicates no off-site modifications to street channelization or intersection control are proposed. Based on site and traffic volume characteristics SDOT would anticipate improvements would be needed to ensure that vehicles entering or leaving into the development does not impact traffic operations on surrounding streets. This may require curb line, channelization or intersection control improvements to mitigate these localized impacts.

Page 3-25, Table 3-1 -12: This table indicates that a fair number of intersections under alternatives reduce LOS to E or lower. Mitigation will be necessary to ensure traffic operations does not breakdown. Refer also to the Parking Demand comment above listed under pages 3-19 and 3-20.

Page 3-27, there should be more information on the impacts to the transit services and alternate routes during construction.

Pages 3-23 & 3-40, Sections 3.1-4 through 3.1-6 and 3.3: In general, the significant and adverse impacts have not been fully disclosed to adequately mitigate the impacts of the proposed development. For example (and as listed above) impacts to Air Quality due to project traffic have not been performed, site access and it's significant impact on surrounding street system, lack of agreements for all deficient

## SDOT-23

**Response:** The text has been revised as requested:

- **Mercer Corridor Project.** The City's CIP identifies this project to improve transportation facilities in the South Lake Union Mercer Corridor. The project's Environmental Assessment (EA) is currently evaluating design options for widening Mercer Street and converting it to two-way operations.

## SDOT-24

**Response:** See response to SDOT-13 and SDOT-14.

## SDOT-23

## SDOT-24

## SDOT-25

## SDOT-26

## SDOT-27

## SDOT-28

## SDOT-29

## SDOT-30

## SDOT-31

## SDOT-32

## SDOT-33

## SDOT-25

**Response:** In order to provide a conservative, "worst case" analysis of project impacts the improvements identified in the South Lake Union Transportation Plan, including the Mercer Corridor Improvements, were not included in the analysis of either 2010 or 2025 project impacts. It is anticipated that the intersection operations documented in the DEIS would be generally improved with the implementation of the improvements identified in the South Lake Union Transportation Plan. Hence, project impacts would likely be reduced at those intersections where improvements have been identified.

At the time the DEIS analysis was prepared, the City had not yet selected a preferred alternative for the Mercer Corridor Improvements. Therefore, traffic forecasts based on having the Mercer Corridor improvements in place were not available for use as the basis of a traffic impact analysis. At this time, although the City has identified construction of the Mercer Corridor Improvements to begin in 2008, funding for the project has yet to be secured.

## SDOT-26

**Response:** The impacts of the traffic have been evaluated. See Tables 3.1-7 and 3.1-8.

## SDOT-27

**Response:** The Land Use Code required parking is being provided through construction of on-site parking and leasing spaces in the adjacent Seattle Center garage. The deficit of parking is not in required parking, but is in estimated parking demand. Overflow parking needs can be met in a number of ways, including on-street parking, leased lots, or use of existing unused parking. The TMP is intended to reduce the dependence of single occupancy vehicles and will include a monitoring program.

## SDOT-28

**Response:** See response to SDOT-20 above.

**SDOT-29**

**Response:** Comment noted. Alternative 1 is the No Build Alternative.

**SDOT-30**

**Response:** See response to SDOT-14 above.

**SDOT-31**

**Response:** DPD agrees with your comment and mitigation has been proposed. See Table 1-3 and Section 3.1.4.

**SDOT-32**

**Response:** See page 3-43. The consideration of potential displacement and relocation of nearby bus stops is required as part of the construction phase transportation and pedestrian circulation plan.

**SDOT-33**

**Response:** See response to SDOT-3 above concerning Air Quality. See responses to SDOT-13 and SDOT-14 concerning site access. See response to SDOT-27 concerning parking supply. See response to SDOT-18 concerning signal optimization. See response to SDOT-11 concerning setbacks from Mercer Street. See response to SDOT-1 concerning the Mercer Corridor Improvement construction schedule.

DPD is not aware of specific Queen Anne/South Lake Union grid goals for this site other than the potential for re-establishing Sixth Avenue North through the property. The applicant has proposed to construct the initial phase of the project on the northwestern portion of the site in order to provide additional time for the City to obtain funding and develop plans for Sixth Avenue.



parking supply for the life of the development or alternatively a very aggressive TDM program, consideration of signal coordination for the system of signals to ensure an efficient optimization of identified signal locations, setback needs on Mercer on Alternative 1, the recognition of Mercer Corridor Improvement construction schedule and the impacts of development and the cumulative impacts of all these significant issues on the environment. Finally, how this development in Alternative 2 and 3 meets the City's connecting Queen Anne/South Lake Union grid goals.

Page 3-31, Figure 3-3: This figure indicates Republican and Roy are connected across SR 99 this could be changed to "possible connections". Also strike the word "tunnel" from the phrase Board Street Tunnel.

Appendix A, Page 14, Table 2: This table evaluates Intersection Accident History and seems to indicate that the highest location with 11 accidents per year (average) is relatively low and does not present any specific traffic safety concern. SDOT questions the basis for this statement and would think that this development adding more traffic to this intersection may warrant some mitigation to offset the potential increase in accidents. Additional investigation may be necessary to support this statement or develop mitigation for the issue.

If you have any questions feel free to contact me at 206-684-5150, or via email at [Urania.perez@seattle.gov](mailto:Urania.perez@seattle.gov)

Cc: Katherine Casseday, SDOT  
Wayne Wentz, SDOT  
Mike Johnson, SDOT  
George Drageth, SDOT  
Eric Tweit, SDOT  
Angie Brady, SDOT  
Steve Pearce, SDOT  
Larry Huggins, SDOT

## SDOT-34

**Response:** The figure title has been changed to "Site Vicinity Potential Infrastructure Improvements" and "Tunnel" has been deleted from "Broad St Tunnel Infilled".

## SDOT-35

**Response:** The analysis in Appendix A, beginning on page 13, includes potential means for reducing the risks of accidents ("Enforcement of red light violations and posting "do not block intersection" signs".) Pages 28 and 44 both state that the increase in traffic may impact the existing safety hazards.

### SDOT-33 (Continued)

### SDOT-34

### SDOT-35



**King County Department of Transportation**  
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June 9, 2006

Ms. Molly Hurley, Senior Land Use Planner  
 Seattle Department of Planning and Development  
 700 5<sup>th</sup> Ave., Suite 2000  
 Seattle, WA 98104

**Subject: 500 5<sup>th</sup> Avenue North Draft EIS**

Dear Ms. Hurley:

King County Metro Transit staff reviewed the 500 5<sup>th</sup> Ave. North Project and would like to offer the following comments.

The EIS refers to the project as an office campus environment that will be built over time. This warrants the development of an 'institutional demand management program' similar to those developed for the University of Washington, Children's Hospital, Fred Hutchinson Cancer Center and Microsoft. Those employers have created award winning programs that are committed to decreasing SOV commute and non-commute trips. The core elements of the program include aggressive use of transit passes, support of bike programs, and major disincentives to SOV use. A campus-wide program should use parking revenues to support the TDM program. The program should be staffed by a full time employee with a commitment from management to innovation and constant improvement.

**KC-1**

The EIS refers to both moderate and aggressive TMP assumptions. However, the transit mode split targets are smaller than those adopted by other large employers in the area. The Pacific Science Center has the following mode splits: 32% for SOV, 31% for transit, and 12% for carpools. If the Gates Foundation can set goals that are at least what other employers are attaining, then parking demand would be significantly less.

**KC-2**

The project site is located near excellent transit connections. The area is expected to receive major new regional service with potential RapidRide BRT lines running both north and south. The South Lake Union area can expect regional express service as development increases. Those improvements present opportunities to decrease SOV use and the need for parking which should help with the implementation of more aggressive mode split goals.

**KC-3**

We invite the developer to call Ref Lindmark at 684-1104 for information on demand management programs that would lead to a more successful project. Thank you for the opportunity to comment on this proposal.

**KC-4**

Sincerely, 

Gary Kriedt  
 Senior Environmental Planner

MOBILITY FOR THE REGION

## KCM-1

**Response:** As a condition of the Master Use Permit, the City will require a Transportation Management Program be developed consistent with the requirements of the Seattle Department of Transportation (SDOT) Director's Rule 94-3, and the Department of Planning and Development (DPD) Director's Rule 14-2002 (See Section 3.1.4 Mitigation Measures).

## KCM-2

**Response:** The long-term TMP goals of 50% SOV, 20% carpool and 30% transit/other are consistent with the TMP goals for similar types of uses approved by DPD in the area.

## KCM-3

**Response:** The City supports the planned improvements to both the nearby and regional transportation systems as means to present new opportunities to decrease SOV use. As noted in SDOT's comment letter in SDOT-22, Aurora Avenue North on the east border of the site is a major barrier to pedestrian and bicycle travel.

## KCM-4

**Response:** Thank you for the contact information. We will ask the traffic consultant, The Transpo Group, to contact Mr. Lindmark to discuss methods that can be implemented as part of developing the TMP.

## **Appendix A - Transportation**

# Traffic and Transportation Technical Report

## 500 Fifth Avenue North

Prepared for:  
IRIS Holdings, LLC

April 2006

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# Introduction

The analyses of traffic and parking impacts associated with the proposed development alternatives proposed for the 500 Fifth Avenue North project were conducted according to City of Seattle procedures for impact review under the State Environmental Policy Act (SEPA). Impacts are defined as the conditions that would occur with the proposed development (*Alternative 2, Alternative 3, and Alternative 4*) as compared with the conditions without the proposed project (*Alternative 1*). The traffic analysis focuses on the traffic impacts occurring during the peak morning and afternoon commute period, also known as the AM and PM peak hours. The parking impacts evaluate average weekday peak conditions. These analysis conditions were selected since they reflect time periods when the combined effect of project and background traffic volumes is highest and thus the impacts of the proposed project are the greatest.

## Project Location and Description

The 500 Fifth Avenue North project is proposed to develop a unified office campus for the Bill and Melinda Gates Foundation. The 500 Fifth Avenue North site is bounded by Mercer St. on the north, Harrison St. on the south, 5<sup>th</sup> Ave. N. on the west, Broad St. on the southeast, and Aurora Ave. N. on the east. The site vicinity is shown in Figure 1.

The existing project site contains a surface parking lot of approximately 1,217 spaces serving the Seattle Center, and the Seattle Supersonics basketball practice facility. Access to the existing parking lot and practice facility is provided from 5<sup>th</sup> Ave. N. via the signalized intersection with Republican Street. Additional egress from the parking lot can be provided via secondary accesses located along Harrison St. and Mercer St. These secondary access locations are gated and are typically opened only after large events or during emergencies.

All of the build *Alternatives (2, 3 and 4)* assume that the existing surface parking will be relocated into the Seattle Center Parking Garage, to be constructed on the northeast corner of the intersection of 5<sup>th</sup> Ave. N./Harrison St. The parking garage is being developed under a separate permit for which the SEPA review has already been completed and the Master Use Permit (MUP) has already been issued. The garage is anticipated to include approximately 1,038 parking stalls. Access to the Seattle Center Parking Garage will be via provided primarily via the signalized intersection of 5<sup>th</sup> Avenue/Republican Street. Secondary access is provided via a stop-controlled right-in/right-out driveway from Harrison Street.

*Alternative 1*, the no-action alternative, assumes that the existing land uses, structures, parking, and driveways would remain and provides a baseline for comparing each of the development alternatives. In addition, no roadway improvements were assumed for Mercer Street, 6<sup>th</sup> Avenue, or Aurora Avenue.

*Alternative 2* would include the development of up to 1,000,000 square feet of office space spread through several buildings located in a campus setting. The campus is being developed through the Major Phased Development (MPD) process, which would vest project approval for a period of 15 years. This sets the horizon year for the full development of the project as 2025. Construction of the proposed project would be completed in phases, with the initial phase including approximately 420,000 square feet of development.

*Alternative 3* would include the development of up to 900,000 square feet of office space spread through several buildings located in a campus setting. This would again be accomplished through the Major Phased Development (MPD) process, thus setting the horizon year for the full development



of the project as 2025. Construction of the proposed project would be completed in phases, with the initial phase unchanged from *Alternative 2*, including approximately 420,000 square feet of development.

*Alternative 4* is consistent with *Alternative 3*, including the development of up to 900,000 square feet of office space spread through several buildings located in a campus setting. *Alternative 4* would however, include the proposed improvements to Mercer Street, 6<sup>th</sup> Avenue, and Aurora Avenue directly adjacent to the project site.

Under each of the development *Alternatives* (2, 3, and 4), approximately 450 parking stalls are proposed to be provided for the initial phase of which 204 would be built on-site and 246 made available through a covenant in the adjacent Seattle Center garage. At full build-out of the campus with each development *Alternative*, there would approximately 1,226 parking stalls proposed, of which 980 spaces would be constructed on-site and 246 made available through a covenant in the adjacent Seattle Center garage.

For *Alternatives 2* and *3*, site access for the campus is proposed to be provided primarily via the existing signalized site access where Republican St. intersects with 5<sup>th</sup> Ave. N. In addition, a right-in/right-out access is proposed to be provided along the Mercer Street frontage. For *Alternative 4*, additional access to the campus would likely be provided from 6<sup>th</sup> Avenue.

## Study Approach

The study area and technical methodologies were identified in advance through coordination with City of Seattle staff and as a result of comments received during the scoping period. The study area includes adjacent roadways and 24 study intersections.

This study reviews the affected street system, traffic volumes and operations, traffic safety, transit, non-motorized facilities, and parking conditions associated with the site, as well as the surrounding neighborhood. The following sections document existing conditions, future baseline conditions, and project impacts, as well as identifying potential mitigation measures, where appropriate.

Since it is anticipated that the project will proceed in phases, the analysis of project impacts is broken-out for both the initial phase of development (2010) and for full build-out of the project (2025).

It is noted that the project is proximate to, and would be impacted by the Alaskan Way Viaduct and Seawall Replacement project as it relates to the portions north of the Battery Street tunnel. In addition, the Mercer Corridor EIS is evaluating the potential conversion of Mercer Street to a two-way boulevard. At the time of this analysis, neither project is approved or funded. Further, analysis results for each remain under development. Therefore, this analysis considers the impacts of the subject project in the context of the existing infrastructure. An analysis alternative with 6<sup>th</sup> Avenue reconnected through the project site is included, but cannot be quantitatively evaluated until the analysis of the other projects, which include the reconstruction of 6<sup>th</sup> Avenue, are completed and made available to the public. To the extent that this occurs during the coming weeks/months, a detailed evaluation will be provided as part of the FEIS documentation for this project.

## Affected Environment

The following section documents the existing transportation network and conditions in the vicinity of the proposed project, including the existing street system, traffic volumes, traffic operations, transit service and facilities, non-motorized facilities, current safety conditions, and parking conditions. The project study area and project site are illustrated in Figure 1.

### Roadway Network

In general, the street system surrounding the site is a combination of one-way and two-way multi-lane streets, typically with on-street parking and sidewalks. Arterial streets within the City have speed limits of 30 miles per hour (mph) unless otherwise posted. Commercial and residential streets generally are posted at 25 mph. The signalized study intersections are controlled with actuated traffic signals, many of which are coordinated with adjacent signals. At unsignalized study intersections, traffic on the minor approach is controlled with stop signs. The individual characteristics of the adjacent study roadways are described in detail below with north-south streets described first, followed by east-west streets.

Figure 2 illustrates the existing intersection channelization and traffic control found in the study area and used in the analysis.

**1<sup>st</sup> Ave. N.** is classified as a minor arterial to the south of Denny Way, as a principal arterial between Denny Way and Roy Street, and as a secondary street to the north of Roy Street. To the south of Denny Way, 1<sup>st</sup> Ave. N. is a two-way roadway with two northbound and one to two southbound travel lanes. Between Denny Way and Mercer St., 1<sup>st</sup> Ave. N. is one-way northbound, with three travel lanes. Between Mercer St. and Roy St., 1<sup>st</sup> Ave. N. resumes two-way operations with one travel lane in each direction. Sidewalks and on-street parking are generally provided along both sides of the street.

**5<sup>th</sup> Ave. N.** is classified as a two-way principal arterial. There are two lanes in the southbound direction and two/three lanes in the northbound direction with turn pockets at major intersections and a landscaped median adjacent to the Seattle Center. 5<sup>th</sup> Ave. N. separates the project site from Seattle Center to the west. 5<sup>th</sup> Ave. N. connects Mercer St. to Broad St. and Denny Way. South of Mercer Street, parking exists on the west side of the street between John and Broad Streets beneath the monorail tracks, parking exists on both sides of the street to the north of Mercer Street.

**Aurora Avenue N (SR 99)** is a four- to six-lane divided freeway/expressway with a posted speed limit of 40 mph north of Denny Way. On-street parking is prohibited and pedestrian/bicycle facilities are limited along Aurora Avenue N. In addition to Interstate 5 (I-5), Aurora Avenue N serves as a major north/south facility connecting downtown Seattle and the communities north of downtown.

**Dexter Ave. N.** is classified as a principal arterial. The street has four travel lanes, bike lanes, parking and sidewalks on both sides of the street. This street does not have a center turn lane or turn pockets at intersections between Denny Way and Mercer St.

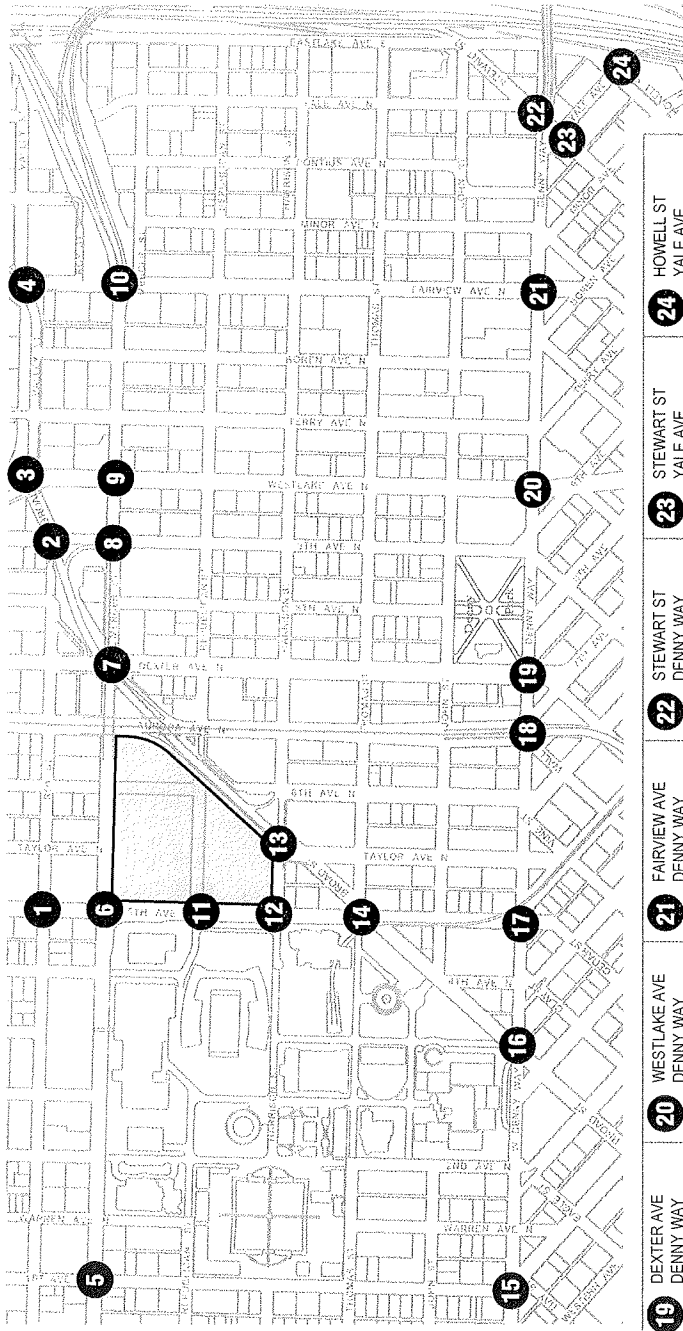
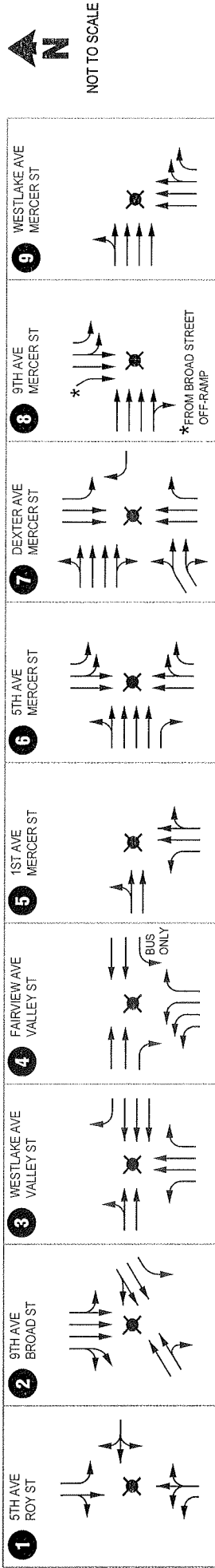
**9<sup>th</sup> Ave. N.** is a one-way arterial in the southbound direction. The street has three travel lanes, parking and sidewalks on both sides, with traffic signals at major intersections. 9<sup>th</sup> Ave. N. connects Westlake Ave. N. and Broad St. south to Denny Way.



**Figure 1**  
Site Vicinity

500 Fifth Avenue North

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**Figure 2**  
Existing Intersection Channelization and Control  
500 Fifth Avenue North

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**Westlake Ave. N** is a one-way arterial in the northbound direction. The street has four lanes, and parking and sidewalks on both sides of the street. Traffic signals are located at the major intersections. Westlake Ave. N. has been designated by the City as a “Green Street,” and as such will be enhanced with boulevard-like streetscape treatments that will be designed under the support of a special City program.

**Fairview Ave. N.** is a three- to four-lane, two-way, north/south principal arterial extending from its intersection with Denny Way north to its intersection with Eastlake Ave. E. at the southeast shoreline of Lake Union. A center left-turn lane extends the length of Fairview Avenue within the study area. Sidewalks are provided along both sides of the street and parking is allowed on both sides of the street, except during the peak hour period. In order to provide an extra travel lane in the peak direction parking is prohibited on the east side of the street between 4 and 6 pm and on the west side of the street between 7 and 9 am.

**Broad St.** is classified as a principal arterial with four to five travel lanes, and sidewalks on both sides of the street. Traffic Signals are located at major intersections, and many minor intersections have turn restrictions. The arterial is partially lowered below-grade and runs diagonally, connecting Valley Street to the north/east with Denny Way to the south, bordering the southeast side of the project site.

**Roy St.** is a principal arterial west of 5<sup>th</sup> Ave. N. and a minor arterial east of 5<sup>th</sup> Ave. N. with sidewalks are present on both sides of the street. The intersection with 5<sup>th</sup> Ave. N. is the only study intersection on Roy St.

**Valley St.** is a four-to-five lane principal arterial in the east-west direction. It has two lanes in each direction with a posted speed limit of 30 mph. The Valley St. arterial exists only between Fairview Ave. N. on the east and Broad St. on the west. Westbound flow is primarily provided as an opposing flow to Mercer St.’s existing eastbound flow. Eastbound flow on Valley St. is an extension of Broad St. to Fairview Ave. N.

**Mercer St.** is a four- to five-lane, one-way, eastbound principal arterial extending from Elliott Ave. N. to Fairview Ave. N. East of Fairview Ave. N. and south of the I-5 on/off ramps, Mercer St. continues as a minor two-lane, one-way arterial to Eastlake Ave. E., with on-street parking on both sides of the street. Mercer St. provides the greatest capacity to I-5 from the waterfront and the Seattle Center area. It has sidewalks on both sides.

**Republican St.** is a two-lane, two-way, east/west roadway that is classified as an access street adjacent to the project site. It extends one block west from 5<sup>th</sup> Avenue (across 5<sup>th</sup> Avenue from the 5<sup>th</sup> Avenue entrance to the existing surface parking lot) and it provides on-street parking and pedestrian sidewalks on both sides of the street in the study area.

**6<sup>th</sup> Ave.** is a two-lane, two-way, north/south roadway that is classified as an access street adjacent to the project site. 6<sup>th</sup> Avenue currently does not pass through the project site, dead-ending to the north of Mercer St. and at Broad St. Sidewalks and on-street parking are provided along both sides of the street in the study area.

**Harrison St.** is a four-lane, two-way, east/west roadway that is classified as a collector arterial in the site vicinity. It extends from just west of 5<sup>th</sup> Avenue to Broad St and provides on-street parking and pedestrian sidewalks on both sides of the street.

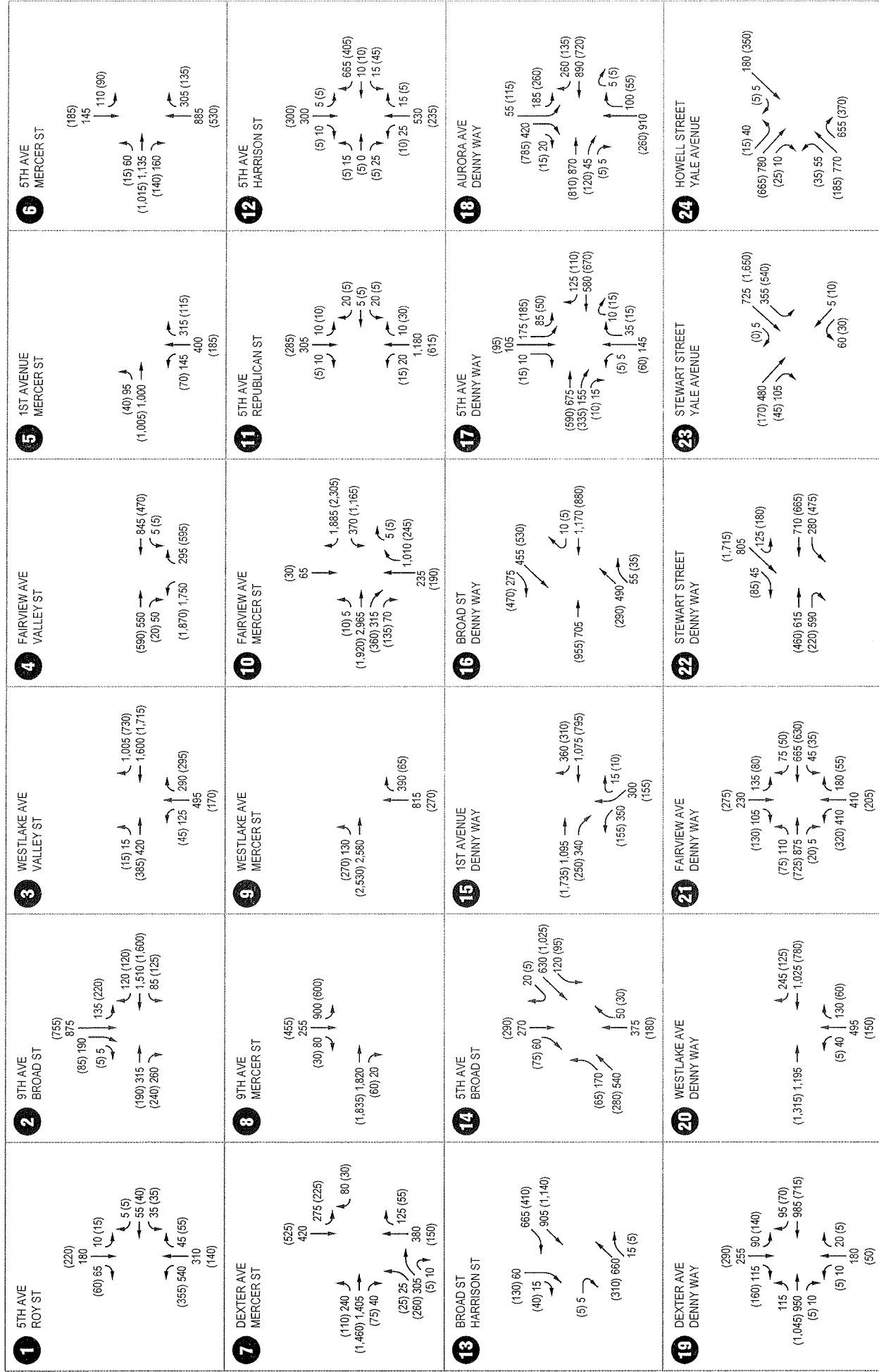
**Denny Way** is classified as a principal arterial, with four travel lanes and sidewalks but no on-street parking. This street provides a major east-west connection between Elliott Ave. N. and the Seattle

Center area on the west, and to I-5 and the Capital Hill area on the east. Within the study area, traffic signals exist at many of the intersections along Denny Way. Study intersections along Denny Way include the signals at Broad Street, 5<sup>th</sup> Ave. N., Dexter Ave. N., Westlake Ave. N., and Fairview Ave. N.

### **Existing Traffic Volumes**

Traffic volume data were compiled for the study area to characterize weekday traffic conditions during the AM and PM peak hours. The peak hours document traffic conditions during the hours of highest traffic volume and congestion in the site vicinity. Due to commute patterns and a number of streets in the area that are operated as one-way arterials, travel patterns differ between the AM and PM peak hours. Thus, the evaluation of these two time periods provides a complete perspective of peak hour operations within the study area.

Included in the existing traffic volumes is traffic generated by the existing uses located on the proposed project site. New traffic counts were conducted at all study intersections during 2005. Figure 3 summarizes existing weekday AM and PM peak hour traffic volumes within the study area.



LEGEND  
(X) = AM PEAK HOUR  
X = PM PEAK HOUR



NOT TO SCALE

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**Figure 3**  
Existing Traffic Volumes

500 Fifth Avenue North



## Intersection Operations

A level of service (LOS) analysis was conducted at each study intersection for the weekday AM and PM peak hours. The intersections were analyzed using Synchro 6.0 for both the signalized and unsignalized intersections within the study area. This software program is based on methodologies presented in the *Highway Capacity Manual*<sup>1</sup>. LOS values range from LOS A, indicating good operating conditions with little or no delay, to LOS F, indicating extreme congestion and long vehicle delays. LOS is measured in terms of average delay per vehicle and is reported for the intersection as a whole for signalized intersections. Unsignalized intersections are reported in terms of average delay by movement. A more detailed explanation of LOS criteria is provided in Attachment A. Transportation concurrency is a measure of the capacity of arterial screenlines to accommodate traffic, as described below.

The City's *Comprehensive Plan* does not define a LOS standard for individual *intersections*. Instead, operational standards focus on characteristics of the overall transportation system over which the City has some influence and control. Specifically, the City defines *arterial* levels of service to be the ratio of traffic volumes to capacity (v/c ratio) at designated screenlines, each of which includes two or more parallel arterial routes. The operational standard measures the PM peak hour directional traffic volumes on the arterials crossing each screenline to calculate an overall screenline level of service. To evaluate the performance of the arterial system, the calculated level of service for each screenline is compared with the level of service standard for a particular screenline, as defined by the City. The level of service standard is typically a v/c ratio of 1.0 to 1.2 for each screenline. The performance of the transportation system based on the above-noted screenline standards is analyzed in the *Transportation Concurrency* section for the development alternatives.

Table 1 summarizes the existing AM and PM peak hour LOS at each study intersection. At signalized study intersections, the signal timing and phasing information provided by the City was used to calculate intersection LOS and delay under existing conditions. This approach is likely conservative as all of these intersections would operate with optimized signal timing to reflect traffic patterns on the given day of the traffic counts. The LOS worksheets are included in Attachment B.

---

<sup>1</sup> Transportation Research Board, 2000.

**Table 1. 2005 Existing AM and PM Peak Hour LOS Summary**

#	Intersection	AM Peak Hour			PM Peak Hour		
		LOS <sup>1</sup>	Delay <sup>2</sup>	V/C <sup>3</sup> or WM <sup>4</sup>	LOS	Delay	V/C or WM
1	5 <sup>th</sup> Ave/Roy St	C	25.9	0.49	B	18.6	0.64
2	9 <sup>th</sup> Ave/Broad St	D	36.1	0.95	C	28.5	0.87
3	Westlake Ave/Valley St	B	11.2	0.51	B	17.4	0.94
4	Fairview Ave/Valley St	C	29.1	0.76	C	26.1	0.70
5	1 <sup>st</sup> Ave/Mercer St	B	13.5	0.45	B	17.9	0.60
6	5 <sup>th</sup> Ave/Mercer St	D	39.4	0.42	C	21.2	0.59
7	Dexter Ave/Mercer St	D	41.9	0.74	E	59.6	0.93
8	9 <sup>th</sup> Ave/Mercer St	B	19.7	0.71	C	33.3	0.72
9	Westlake Ave/Mercer St	A	8.1	0.62	B	19.8	0.75
10	Fairview Ave/Mercer St	F	87.3	1.07	E	68.9	1.14
11	5 <sup>th</sup> Ave/Republican St	A	8.8	0.16	A	3.7	0.30
12	5 <sup>th</sup> Ave/Harrison St	C	33.2	0.29	B	19.8	0.48
13	Broad St/Harrison St	C	17.9	EB	C	17.3	EB
14	5 <sup>th</sup> Ave/Broad St	D	44.2	0.52	C	21.8	0.53
15	1 <sup>st</sup> Ave/Denny Way	B	12.2	0.75	B	14.0	0.71
16	Broad St/Denny Way	B	18.0	0.66	B	20.4	0.60
17	5 <sup>th</sup> Ave/Denny Way	B	13.3	0.53	B	15.6	0.56
18	Aurora Ave/Denny Way	C	27.8	0.75	E	64.4	0.83
19	Dexter Ave/Denny Way	B	14.0	0.51	B	15.1	0.64
20	Westlake Ave/Denny Way	A	7.1	0.51	B	13.4	0.60
21	Fairview Ave/Denny Way	C	28.5	0.63	D	36.6	0.69
22	Stewart St/Denny Way	D	45.2	0.99	C	30.8	0.84
23	Stewart St/Yale Ave	A	4.5	- <sup>5</sup>	B	13.6	- <sup>5</sup>
24	Howell St/Yale Ave	D	48.1	0.91	E	68.9	1.09

1. Level of service, based on 2000 HCM methodology.

2. Average delay per vehicle, in seconds.

3. V/C = Volume-to-capacity ratio for signalized intersections.

4. WM = worst movement or approach for unsignalized intersections.

5. Intersection runs on controller at Stewart/Denny; resulting v/c ratio not applicable to this intersection.

\* Unsignalized intersection.

As shown in Table 1, during the AM peak hour, all study intersections operate at LOS D or above, with the exception of the Fairview Ave. N./Mercer St. intersection, which currently operates at LOS F. During the PM peak hour, all study intersections operate at LOS D or better with the exceptions of the Dexter Ave. N./Mercer St., Fairview Ave. N./Mercer St., Aurora Ave./Denny Way, and Yale Ave./Howell St. intersections which operate at LOS E. The following provides a more descriptive evaluation of these intersections:

**#7. Dexter Ave. N./Mercer St.** This signalized intersection operates at LOS E during the PM peak hour primarily due to high traffic volumes on both the northbound and eastbound approaches to the intersection, while the existing signal timing allocates the majority of available green time to the Mercer Street approach.

**#10. Fairview Ave. N./Mercer St.** During both the AM and PM peak hours, the delay experienced at this intersection is primarily due to the high traffic volumes using the on- and off-ramps to/from I-5. This intersection's location and geometry provide constraints that prohibit significant widening,

re-channelization, or signal improvements. Therefore, this intersection is expected to continue to operate at LOS F during the weekday AM peak hour with long vehicle delays along Mercer St.

**#18. Aurora Ave./Denny Way.** The signalized intersections of the Aurora Avenue NB On-Ramps and SB Off-Ramp at Denny Way operate at LOS E during the PM peak hour due to the high eastbound/westbound traffic volumes on Denny Way traveling to/from I-5 to the east, combined with high traffic volumes accessing Aurora Avenue. This intersection's location and geometry provide constraints that prohibit significant widening, re-channelization, or signal improvements. Therefore, this intersection is expected to continue to operate poorly during the weekday PM peak hour.

**#24. Howell St./Yale Ave.** The signalized intersections of Howell Street/Yale Avenue operate at LOS E during the PM peak hour because of its proximity to I-5, and because of the high traffic volumes exiting/entering the freeway through these intersections.

## Traffic Safety

An analysis of historical accident data was conducted at the study intersections, as well as the roadway segments near the project site. Data was obtained from the City of Seattle for the full three years between January 2002 and December 2004, the most recent time period for which data were available. A summary of the total number and average annual accidents at each study intersection is provided in Table 2, and for the roadway segments adjacent to the project sites is provided in Table 3.

The City of Seattle has identified criteria for classifying intersections that experience above average accident rates as High Accident Locations (HAL): signalized intersections with ten or more accidents per year and unsignalized intersections with an average of five or more accidents per year. Intersections with this designation would be targeted for future safety improvements in an effort to reduce accidents.

Based on the historical accident data in Table 2, three study intersections would meet the City's criteria for a HAL. The intersections of 5<sup>th</sup> Avenue/Mercer Street, 9<sup>th</sup> Avenue/Mercer Street, and Westlake Avenue N./Denny Way had an average accident rate of greater than 10.0 accidents per year. At the 5<sup>th</sup> Avenue/Mercer Street intersection the most common accident type (75 percent) was right-angle collisions. Enforcement of red light violations and posting "do not block intersection" signs are options to consider for reducing this type of behavior.

At the 9<sup>th</sup> Avenue N./Mercer Street intersection, the most common accident type (45 percent) was right-angle collisions, with an additional 40 percent consisting of turning vehicles. Right-angle accidents likely involve either cars violating yellow and/or red lights and being struck by vehicles on the opposing street, or as a result of cars blocking the intersection after a green signal. Enforcement of red light violations and posting "do not block intersection" signs are options to consider for reducing this type of behavior.

At the Westlake Avenue/Denny Way intersection the most common accident type (70 percent) was right-angle collisions. Enforcement of red light violations and posting "do not block intersection" signs are options to consider for reducing this type of behavior.

**Table 2. Intersection Accident History**

#	Intersection	Three-Year Total	Annual Average
1	5 <sup>th</sup> Ave/Roy St	14	4.7
2	9 <sup>th</sup> Ave/Broad St	20	6.7
3	Westlake Ave/Valley St	16	5.3
4	Fairview Ave/Valley St	6	2.0
5	1 <sup>st</sup> Ave/Mercer St	11	3.7
6	5 <sup>th</sup> Ave/Mercer St	33	11.0
7	Dexter Ave/Mercer St	13	4.3
8	9 <sup>th</sup> Ave/Mercer St	32	10.7
9	Westlake Ave/Mercer St	26	8.7
10	Fairview Ave/Mercer St	18	6.0
11	5 <sup>th</sup> Ave/Republican	10	3.3
12	5 <sup>th</sup> Ave/Harrison St	13	4.3
13	Broad St/Harrison St*	2	0.7
14	5 <sup>th</sup> Ave/Broad St	12	4.0
15	1 <sup>st</sup> Ave/Denny Way	13	4.3
16	Broad St/Denny Way	18	6.0
17	5 <sup>th</sup> Ave/Denny Way	4	1.3
18	Aurora Ave/Denny Way	11	3.7
19	Dexter Ave/Denny Way	19	6.3
20	Westlake Ave/Denny Way	32	10.7
21	Fairview Ave/Denny Way	23	7.7
22	Stewart St/Denny Way	14	4.7
23	Stewart St/Yale Ave	10	3.3
24	Howell St/Yale Ave	8	2.7

\* Unsignalized intersection

Historical accident rates on nearby roadway segments are relatively low, and do not appear to present any specific traffic safety concern. The majority of the roadway segment accidents involved side-swipe collisions or rear-end collisions, which is consistent with multi-lane roadways.

**Table 3. Roadway Segment Accident History**

Location	Three-Year Total	Annual Average
5 <sup>th</sup> Avenue		
Harrison St to Republican St	4	1.3
Republican St to Mercer St	8	2.7
Harrison Street		
5 <sup>th</sup> Ave to Taylor Ave	5	1.7
Mercer Street		
5 <sup>th</sup> Ave to Taylor Ave	20	6.7
Taylor Ave to Dexter Ave	9	3.0

The relatively high number of collisions observed on Mercer Street between 5<sup>th</sup> and Taylor Avenues, shown in Table 3, comprised mainly of side-swipe collisions (65%). This is likely attributable to

people making lane changes in advance of the Broad Street underpass median barrier which begins adjacent to Taylor Avenue.

## **Transit Service**

King County Metro operates bus routes close to the project site. Sound Transit's Regional Express bus service does not currently serve the area. The majority of existing routes operate during the weekday AM and PM peak, midday, and evening periods, as well as on weekends. Service headways range from 10 to 60 minutes during the weekday peak hours, and 10 to 120 minutes during the weekday off-peak periods and on weekends. The existing transit service provides local access to the majority of the neighborhoods in the City of Seattle, and regional access to many cities within Puget Sound.

A number of transit stops are located within close proximity of the site. The nearest stops are located north and south of the site on 5<sup>th</sup> Ave. N., and along Aurora Ave. N. These stops serve Routes 3N, 4N, 5, 16, 26, 28, 82, and 358, providing service to Downtown Seattle, Rainier Beach, University District, Northgate, Lake City, Shoreline, White Center and other local and regional locations. From these stops, transit service can be taken to destinations throughout the region. South of the site on Broad St., Routes 3S, 4S, and 74 are served by a westbound stop near 5<sup>th</sup> Ave. N.

The Seattle Center Monorail, the nation's first full-scale commercial monorail system provides additional transit service adjacent to the project site. Service is provided along an approximately one mile long route, connecting the Seattle Center with Westlake Center Mall, at Fifth Avenue and Pine Street, to the south. Typically daily service is provided with a single train traveling between the stations. Service is provided from 7:30 a.m. to 11:00 p.m. on weekdays, and from 9:00 am to 11:00 pm on weekends. The Monorail departs every 10 minutes from each station, with each trip taking approximately two minutes to complete. Each train can carry up to 450 passengers per trip. The Monorail provides two-train service during special events and activities, with departures every five minutes or less.

## **Non-Motorized Facilities**

Walking and biking are important elements of the transportation system adjacent to the project site, especially as they relate to mode choice and the effort to reduce vehicular travel, and due to the proximity to the Seattle Center.

Seattle Center is home to numerous venues, including Pacific Science Center, EMP, and Key Arena. Entertainment is provided year-round, with an annual attendance of more than 10 million visitors to the community festivals, sporting events, concerts, cultural programs, theater performances, conventions and trade shows, and other events. Events range in size from small groups holding meetings and private parties to large events such as Sonics games, music events at Key Arena, and summer festivals. Typically, events are scheduled on the weekends or evenings, with some occurring concurrently. However, at times when the Sonics are playing, or during the weekend festivals, the use of the other facilities may be limited. The Sonics schedule typically includes approximately 45 home games between October and April. This combined with other major events at Key Arena (music concerts, and other sporting events), and at other venues in Seattle Center equates to approximately two major events per week, but may result in as many as four during a single week depending on schedule. Attendance at Sonics games averages 15,000, with a maximum capacity of 17,000. In addition, large Center-wide festivals occur several times during the summer, typically during holiday weekends. These events occur over several days and utilize the entire Center rather than individual facilities, and include Bumbershoot, Folklife, Bite of Seattle and others. Attendance at these festivals reaches over 100,000 spread out over several days.

Fifth Avenue separates Seattle Center, located to the west of Fifth Avenue from the approximately 1,217 stall Seattle Center surface parking lot located to the east of Fifth Avenue. As such pedestrian crossing of Fifth Avenue, between Harrison Street and Mercer Street are higher than at other locations along the Fifth Avenue corridor. This is especially true at times before and after events at Key Arena which have a specific start and end time, and during the summer weekend festivals which tend to generate continuous pedestrian traffic throughout the day. The following describes the existing pedestrian and bicycle facilities in the immediate area of the project site.

### ***Pedestrian Facilities***

Pedestrian facilities consist primarily of 5- to 8-foot-wide sidewalks along both sides of the streets within the study area. Each of the signalized study intersections includes pedestrian crosswalks, push buttons, and signal heads to facilitate pedestrian travel.

### ***Bicycle Facilities***

Based on the *Seattle Bicycling Guide Map* (published by SDOT) there are dedicated bicycle lanes along Dexter Ave. N. With the exception of Dexter Ave. N., bicyclists typically use the vehicle travel lanes for travel in this area.

### **Parking**

The project site currently includes approximately 1,217 spaces in the surface parking lot serving the Seattle Center and Supersonics practice facility. Approximately eight on-street parallel parking stalls are available on the south side of Harrison St. between 5<sup>th</sup> Ave. N. and Broad St.; generally used by nearby businesses.

Use of the existing surface parking lot varies according the demand generated by events occurring at Seattle Center. On typical weekdays, with only minor events scheduled, the parking lot is underutilized with as few as 15 percent (approximately 190 spaces) of the available stalls occupied. When this is the case, the southwest portion of the parking lot experiences 100 percent utilization, while the areas to the north and east remain unused. This can be attributed to the proximity of the southwest parking stalls to the main pedestrian access to the Seattle Center.

At times when major events are scheduled for the Seattle Center venues, the entire parking lot can achieve close to 100 percent utilization. Major weekday events typically occur the evening, and include Seattle Supersonics home games, music concerts in Key Arena, and other events. Typically major weekday events occur in individual venues, and are scheduled so as not to occur concurrently. Weekday evening events which would generate high parking utilization typically occur between one and twice per weekend depending on the time of year (i.e. during the NBA season), but may result in as many as four during a week depending on schedule. During 2004, parking utilization data showed that the surface parking lot achieved 100 percent utilization on two weekdays. Weekday evening events typically have a scheduled start and end time resulting in the majority of vehicles entering the parking lot during a short time period in advance of the event, and leaving the parking lot during the period immediately following the end of the event.

Major weekend events occur several times during the summer, typically during holiday weekends. These events occur over several days and utilize the entire Center rather than individual facilities, and include Bumbershoot, Folklife, Bite of Seattle and others. During 2004, parking utilization data showed that the surface parking lot achieved 100 percent utilization during 15 weekend days.

Weekend events, which occur throughout the day, although having higher attendances typically, experience less pronounced peaks in arrivals or departures.



# Impacts of the 2010 Initial Phase Project Alternatives

This section of the technical report describes the expected traffic and parking conditions within the study area for each of the project alternatives. The impacts associated with the initial phase project alternatives are evaluated for a horizon year of 2010 with a first phase development of approximately ~~400,000~~450,000 square feet.

## Alternative 1 Initial Phase (No Action)

This section of the technical report describes expected traffic and parking conditions within the study area if no new development were to occur on the project site. The *Alternative 1* (No Action) initial phase assumes that the existing land uses; structures, parking, and driveways would remain and provides a baseline for comparing each of the development alternatives. The traffic, circulation, and parking analysis for the *Alternative 1* (No Action) initial phase was conducted for AM and PM peak hour conditions in the year 2010, consistent with the year of potential build-out of the *Alternatives 2, 3, and 4* initial phase.

## Planned Improvements

Planned transportation improvements within the study area are categorized into Roadway, Transit and Rail, and Non-Motorized Improvements. The review of potential transportation improvements provides an overview of what the street system may look and feel like to drivers, pedestrians, and bicyclists within the horizon timeline.

### *Roadway Improvements*

The City of Seattle *2005–2010 Adopted Capital Investment Program* (CIP) was reviewed to identify transportation improvement projects planned for the study area. The CIP lists improvement projects that have been approved by the City and have identified funding sources within the next six years. Within the study area limits, there are several improvements listed for implementation, however, each of these improvements are area-wide projects so the specific improvements that may occur in the study area are not known at this time. The funding outlined in the current CIP for the Mercer Corridor Project is for the completion of an EIS only, and does not include full construction funding.

- **Mercer Corridor Project.** The City's CIP identifies this project to improve transportation facilities in the South Lake Union Mercer Corridor. The project's EIS is currently evaluating several options, including widening Mercer St. and converting it to two-way operations.
- **South Lake Union Street Car.** This project includes construction of a modern streetcar line between Downtown Seattle, South Lake Union Park and Fred Hutchison. It will circulate northbound, in a vehicle travel lane on Westlake Avenue, Thomas Street, Terry Avenue, and then Valley Street to Fred Hutchison. The return route will include Valley Street and Westlake Avenue. Near the subject site, two southbound stops are anticipated on Westlake, south of Mercer and south of Harrison, and northbound on Terry, mid-block between Republican and Mercer, and between Harrison and Thomas Streets. Since nearly all of the funding has been identified, the streetcar and its associated roadway improvements have been incorporated into this analysis. This includes the conversion of Westlake to two-way operations, and the conversion of Terry to one-way

northbound operations between Mercer and John Streets. The streetcar is anticipated to be constructed and in operation by the end of 2007,

Each of these improvements represents a component of the broader *South Lake Union Transportation Study*, which is summarized in a subsequent section.

### ***Rail and Transit Improvements***

The downtown Bus Tunnel will be converted from use by buses to also accommodate light rail as part of the Sound Transit system. Construction of rail lines in the tunnel required the closure of the Bus Tunnel in September 2005 for a period of approximately two years. While the tunnel is closed, bus service that had previously used the Bus Tunnel through Downtown Seattle is being diverted to surface streets. The tunnel is anticipated to reopen to bus service during Fall 2007, with light rail service in the tunnel anticipated to begin during 2009.

### ***Non-Motorized Improvements***

Based on review of the City's CIP, no non-motorized facility improvement projects are currently identified for the study area within the next six years.

### ***South Lake Union Transportation Study***

The City of Seattle is currently evaluating a package of transportation improvements for the South Lake Union area. The improvements have been documented in the South Lake Union Transportation Plan with the goal of improving Seattle's transportation problems, including the "Mercer mess." The Plan has been conceived with broad support from a diverse group of neighborhood, business and community representatives. The goals of the Transportation plan are to reconnect a growing neighborhood to the City, untangle streets that create barriers in the middle of Seattle, improve mobility for people in Queen Anne, Capitol Hill, Eastlake and surrounding neighborhoods that use this corridor, promote transit, walking, and biking, and enhance a smooth flow of freight and people through the corridor.

Although the improvements are being evaluated as part of a package, the specific components identified as part of the overall transportation package will be implemented on an individual basis.

The improvements call for the conversion of Mercer St. from one-way to two-way operations, with the provision of three-travel lanes in each direction and additional turn lanes at intersections. To enable this to occur, Valley St. would be narrowed to a three-lane section with bike lanes. Left turn lanes may be provided at key intersections, as needed, such as Westlake Avenue. These changes would reduce regional traffic on Valley St. while focusing traffic to/from I-5 onto Mercer St. Mercer St. would also be reconnected across Aurora Ave. N., as would Thomas St. In addition, both 9<sup>th</sup> Ave. N. and Westlake Ave. N. would be converted to two-way operations between Roy/Valley St. to the north and Denny Way to the south. Other roadway changes are also being considered to Thomas St., Harrison St., and 6<sup>th</sup> Ave. N. to improve local access and circulation, and to Fairview Ave. N. to improve transit progression, speed and reliability. In addition to the roadway changes, as many as ten intersections are being considered for signalization.

Various improvements are also being considered for non-motorized and transit facilities, with the provision of additional bicycle lanes and improvements to pedestrian and transit facilities. Transit improvements would include new bus routes, increased frequency on existing routes, and the provision of Transit Signal Priority on Fairview Ave. N. to reduce delays for buses. A new streetcar

system is also being considered, as described earlier. The streetcar would operate along Westlake and Terry Avenues, which would be converted to two-way and one-way operations, respectively.

Non-motorized improvements would include the construction of wider sidewalks with curb bulbs and additional crossing locations, and an enhanced pedestrian connection across I-5 on Denny Way. In addition, bike lanes, paths and routes would be created throughout the South Lake Union Neighborhood. Terry Avenue is to be modified to accommodate and emphasize non-motorized and transit users.

However, at this time none of the components of the *South Lake Union Transportation Study* have committed construction funding identified, and it is not anticipated that any of the aforementioned improvements would be completed prior to the occupancy of the proposed project, with the exception of the streetcar. Therefore, only the streetcar-related improvements (two-way Westlake Ave. and one-way Terry Ave.) were assumed as part of the future base case conditions in this transportation analysis. This provides a conservative “worst case” analysis of the impacts associated with the proposed project. Figure 4 shows the intersection channelization that is assumed for the future 2010 analysis.

### ***Developer Improvements***

In addition to the transportation projects identified above, improvements identified to mitigate the impacts of the pipeline projects identified in the following section were included in the analysis of the *Alternative 1* (No Action) initial phase. Three intersection improvement projects have been identified, one proposed to mitigate impacts of the proposed UW Medicine project, the second as part of the proposed 2201 Westlake development, and the third as part of the proposed Seattle Center Garage.

The improvement proposed for the UW Medicine project would remove parking from the eastbound approach to the intersection of Westlake Ave. N./Republican St to provide a separate left-turn lane. The improvement proposed for 2201 Westlake would prohibit the northbound left-turn movement at the Denny Way/Westlake Ave. N. intersection. The improvement proposed for the Seattle Center Garage would implement east/west split phasing at the 5<sup>th</sup> Avenue/Harrison Street intersection, while prohibiting westbound right-turns on red, and providing east/west pedestrian connectivity across the north leg during the eastbound vehicle phase.

### **Traffic Volumes**

The 2010 AM and PM peak hour traffic volumes used in the analysis of the *Alternative 1* (No Action) initial phase are comprised of existing traffic, background traffic growth, and traffic generated from specific planned developments anticipated to be occupied by the year 2010. An annually compounded growth rate of 0.5 percent was applied to existing (year 2005) peak hour volumes to account for general traffic growth in the study area projected by the year 2010. The annual average growth rate was derived from historical counts provided by SDOT at twelve locations in the South Lake Union Area. SDOT supplied traffic count data for the past nine years. All raw traffic count data was adjusted based on seasonal traffic volume factors also supplied by SDOT. Based on this adjusted data, one-, three-, five- and seven-year growth rates were determined for north-south, and east-west corridors in the study area. For each of these cases, the growth rates for weekday AM, PM and daily traffic volumes were calculated.

Review of the historic traffic count data indicated that traffic volumes in the study area have grown at annual rates ranging from negative growth up to 2.0 percent, with little or no identifiable growth along the Mercer St. or Denny Way corridors. Based on these growth trends, an overall annual average growth rate of 0.5 percent per year was established to provide a baseline estimate (before

consideration of known projects) of future traffic growth. In addition, AM and PM peak hour traffic generated by planned development projects, also called “pipeline projects” were identified within the general vicinity.

This approach of using a combination of background traffic growth, coupled with pipeline projects, has been consistently applied in a number of traffic impact studies for Seattle developments that have been reviewed and approved by the City. Applying a 0.5 percent annual traffic growth rate, and specifically including traffic generated by pipeline development generally results in traffic forecasts that exceed historic traffic growth rates. To the extent that this occurs, cumulative traffic volume forecasts with the project and related traffic congestion levels would be higher than actual levels. This approach helps ensure that actual traffic impacts are not underestimated.

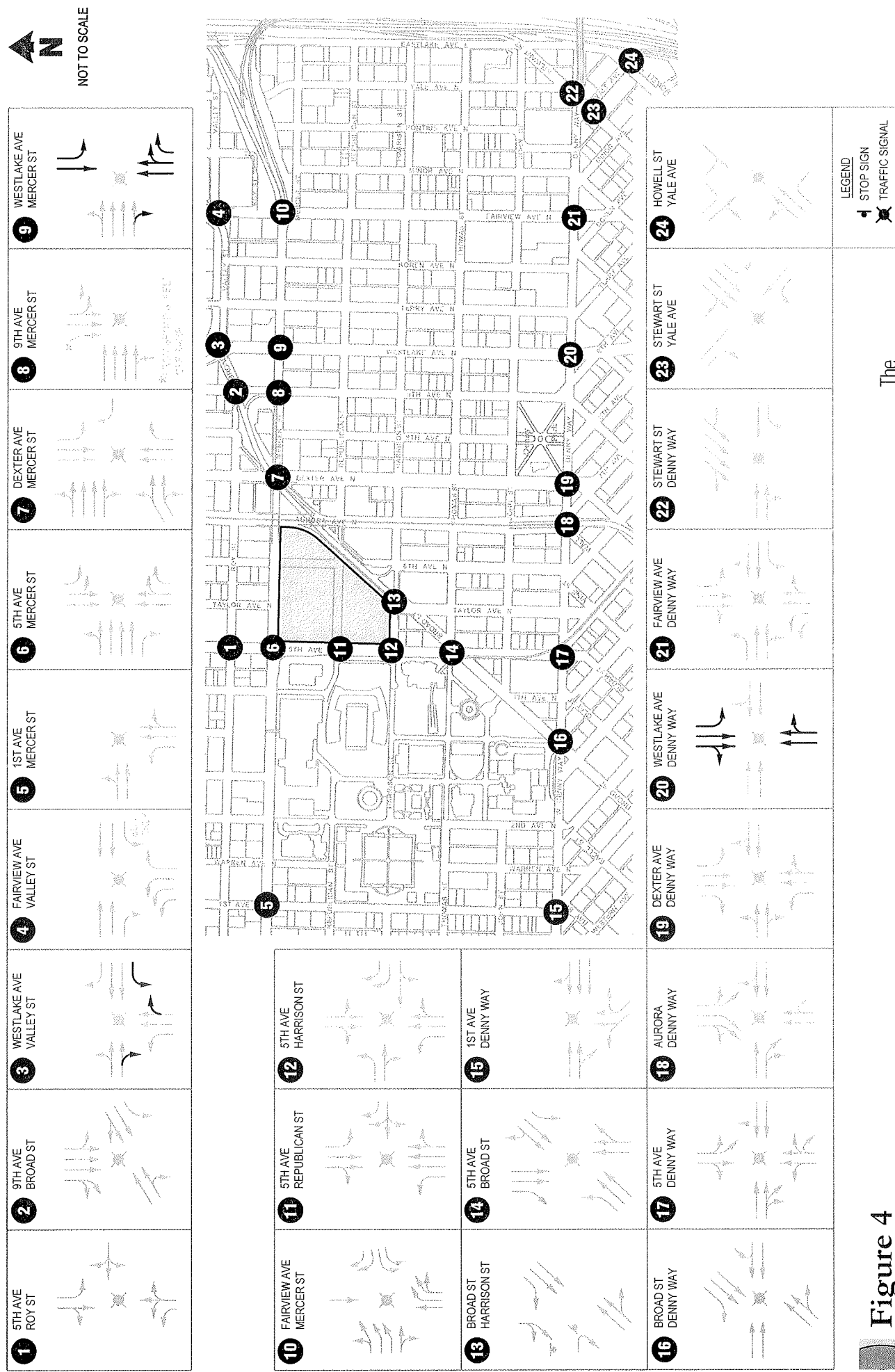
The pipeline projects included in the traffic analyses include those projects listed below. As shown, the analysis includes 22 potential new developments; the list was compiled based on known projects and updated information provided by DPD. The projects represent those that have recently been completed or are known to be in the planning and development stages yet were not open and occupied as of the date the traffic counts used in this analysis were conducted. It is recognized that the list of potential pipeline projects will change over time, as new projects are introduced to DPD and others are dropped due to feasibility. To account for the uncertain viability and timing of completion of these projects, the additional traffic associated with these projects was reduced by approximately 25 percent. This is consistent with other studies in the area. The background growth rate of 0.5 percent would generally account for any other potential development that is not listed below.

- 2<sup>nd</sup>/Lenora
- Alexan Cascade
- Mirabella Retirement
- 2<sup>nd</sup>/Pine
- 2201 Ninth
- 220 Elliott Ave
- UW Medicine (Phase II & III)
- Block 51SE
- 420 Yale Apts
- Bargreen
- Century Tower
- Block T
- 819 Olive
- 600 Denny
- 912 Dexter
- 1540 Eastlake
- 1925 Ninth Avenue
- Interurban Exchange
- 2200 Westlake
- Alley 24<sup>2</sup>
- 1520 Eastlake
- Block 40

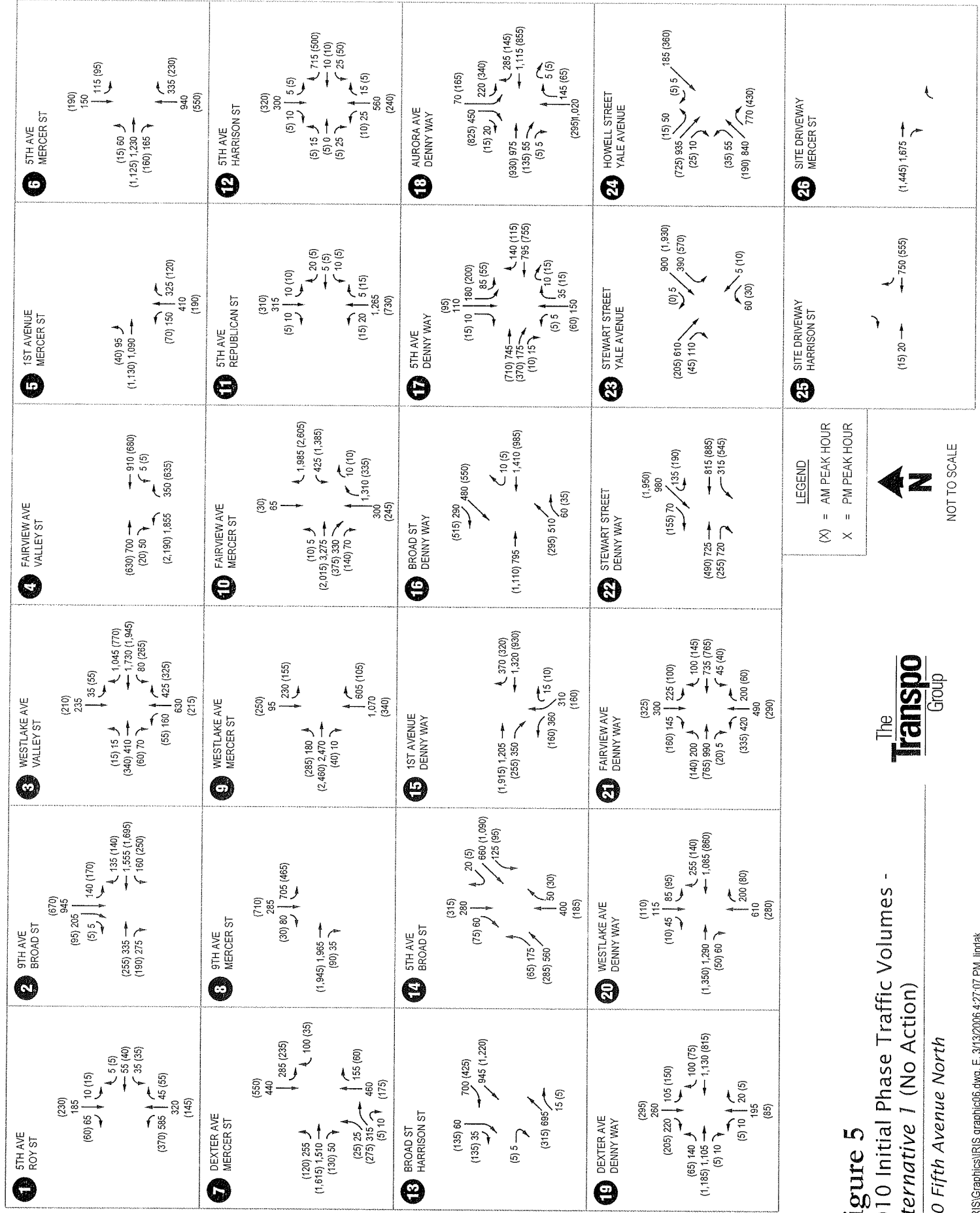
Adjustments were also made to account for the construction of the proposed South Lake Union streetcar project which is anticipated to be complete by 2007. As mentioned above, the streetcar requires the conversion of Westlake to two-way operations, and the conversion of Terry to one-way northbound operations between Mercer and John Streets. Adjustments were made to local travel patterns to reflect these changes.

The peak hour traffic from pipeline projects, added together with the background 0.5 percent annual growth in existing traffic, and the adjustments made to reflect the changes proposed to accommodate the streetcar, result in estimated *Alternative 1* (No Action) initial phase traffic volumes. Figure 5 summarizes the traffic volumes that would occur during the AM and PM peak hour periods for the *Alternative 1* (No Action) initial phase in 2010.

<sup>2</sup> Formerly known as the Richmond Block Re-development.



**Figure 4**  
2010 Initial Phase Intersection Channelization and Control  
*500 Fifth Avenue North*



**Figure 5**  
2010 Initial Phase Traffic Volumes -  
Alternative 1 (No Action)  
500 Fifth Avenue North

The  
**Transpo**  
Group



NOT TO SCALE

## Traffic Operations

Weekday peak hour intersection levels of service (LOS) were calculated for each of the study intersections for the *Alternative 1* (No Action) initial phase. Adjustments were made to the traffic operations analysis to reflect the proposed changes to the local street system to account for the construction of the proposed South Lake Union streetcar project which is anticipated to be complete by 2007. As mentioned above, the streetcar requires the conversion of Westlake to two-way operations, and the conversion of Terry to one-way northbound operations between Mercer and John Streets. Adjustments were made to the local street system to reflect these changes for the LOS analysis.

At those study intersections not located along the proposed streetcar route, the intersection LOS analysis inputs (cycle length, number of lanes, phasing, etc.) remained unchanged from those used for the LOS analysis of existing conditions. The only exception are for intersections with actuated signals, in which case the green times were re-optimized based on year 2010 weekday AM and PM peak hour traffic volumes. Tables 4 and 5 respectively provide a summary of AM and PM peak hour levels of service, delays, and v/c ratios at study intersections for the *Alternative 1* (No Action) initial phase.

**Table 4. 2010 Initial Phase AM Peak Hour LOS Summary – *Alternative 1* (No Action)**

#	Intersection	2005 Existing			2010 Alternative 1 (No Action)		
		LOS <sup>1</sup>	Delay <sup>2</sup>	V/C or WM <sup>3</sup>	LOS	Delay	V/C or WM
1	5 <sup>th</sup> Ave/Roy St	C	25.9	0.49	C	26.5	0.51
2	9 <sup>th</sup> Ave/Broad St	D	36.1	0.95	C	29.5	0.95
3	Westlake Ave/Valley St	B	11.2	0.51	C	23.7	0.88
4	Fairview Ave/Valley St	C	29.1	0.76	C	33.2	0.86
5	1 <sup>st</sup> Ave/Mercer St	B	13.5	0.45	B	14.2	0.50
6	5 <sup>th</sup> Ave/Mercer St	D	39.4	0.42	D	43.5	0.45
7	Dexter Ave/Mercer St	D	41.9	0.74	D	44.1	0.82
8	9 <sup>th</sup> Ave/Mercer St	B	19.7	0.71	C	27.6	0.76
9	Westlake Ave/Mercer St	A	8.1	0.62	C	21.7	0.81
10	Fairview Ave/Mercer St	F	87.3	1.07	F	>120.0	1.25
11	5 <sup>th</sup> Ave/Republican	A	8.8	0.16	A	9.7	0.18
12	5 <sup>th</sup> Ave/Harrison St	C	33.2	0.29	C	34.2	0.36
13	Broad St/Harrison St*	C	17.9	EB	C	19.0	EB
14	5 <sup>th</sup> Ave/Broad St	D	44.2	0.52	D	47.6	0.53
15	1 <sup>st</sup> Ave/Denny Way	B	12.2	0.75	B	14.8	0.81
16	Broad St/Denny Way	B	18.0	0.66	C	20.4	0.76
17	5 <sup>th</sup> Ave/Denny Way	B	13.3	0.53	B	13.1	0.60
18	Aurora Ave/Denny Way	C	27.8	0.75	D	45.3	0.92
19	Dexter Ave/Denny Way	B	14.0	0.51	B	15.9	0.67
20	Westlake Ave/Denny Way	A	7.1	0.51	B	14.5	0.68
21	Fairview Ave/Denny Way	C	28.5	0.63	C	34.7	0.80
22	Stewart St/Denny Way	D	45.2	0.99	F	90.7	1.14
23	Stewart St/Yale Ave	A	4.5	– <sup>5</sup>	A	5.2	– <sup>5</sup>
24	Howell St/Yale Ave	D	48.1	0.91	E	66.7	1.04

1. Level of service, based on 2000 HCM methodology.

2. Average delay per vehicle, in seconds.

3. V/C = Volume-to-capacity ratio for signalized intersections, WM= worst movement/approach for unsignalized intersections.

4. Based on the v/c ratio of greater than 1.20, vehicle delay at this intersection may be greater than reported in the table.

5. Intersection runs on controller at Stewart/Denny; resulting v/c ratio not applicable to this intersection.

\* Unsignalized intersection



**Table 5. 2010 Initial Phase PM Peak Hour LOS Summary – *Alternative 1* (No Action)**

#	Intersection	2005 Existing			2010 <i>Alternative 1</i> (No Action)		
		LOS <sup>1</sup>	Delay <sup>2</sup>	V/C or WM <sup>3</sup>	LOS	Delay	V/C or WM
1	5 <sup>th</sup> Ave/Roy St	B	18.6	0.64	C	20.1	0.66
2	9 <sup>th</sup> Ave/Broad St	C	28.5	0.87	C	25.4	0.92
3	Westlake Ave/Valley St	B	17.4	0.94	D	50.6	1.16
4	Fairview Ave/Valley St	C	26.1	0.70	C	28.9	0.77
5	1 <sup>st</sup> Ave/Mercer St	B	17.9	0.60	B	19.0	0.63
6	5 <sup>th</sup> Ave/Mercer St	C	21.2	0.59	C	26.5	0.63
7	Dexter Ave/Mercer St	E	59.6	0.93	E	68.3	1.04
8	9 <sup>th</sup> Ave/Mercer St	C	33.3	0.72	C	30.2	0.69
9	Westlake Ave/Mercer St	B	19.8	0.75	F	106.2	1.09
10	Fairview Ave/Mercer St	E	68.9	1.14	F	>120.0	1.35
11	5 <sup>th</sup> Ave/Republican	A	3.7	0.30	A	3.4	0.31
12	5 <sup>th</sup> Ave/Harrison St	B	19.8	0.48	C	30.2	0.58
13	Broad St/Harrison St*	C	17.3	EB	C	18.0	EB
14	5 <sup>th</sup> Ave/Broad St	C	21.8	0.53	C	21.4	0.55
15	1 <sup>st</sup> Ave/Denny Way	B	14.0	0.71	B	15.9	0.78
16	Broad St/Denny Way	B	20.3	0.60	C	20.6	0.71
17	5 <sup>th</sup> Ave/Denny Way	B	15.9	0.56	B	16.0	0.61
18	Aurora Ave/Denny Way	E	64.4	0.83	F	>120.0	1.13
19	Dexter Ave/Denny Way	B	15.1	0.64	B	16.3	0.80
20	Westlake Ave/Denny Way	B	13.4	0.60	C	22.0	0.85
21	Fairview Ave/Denny Way	D	36.6	0.69	E	55.3	0.90
22	Stewart St/Denny Way	C	30.8	0.84	D	53.7	1.00
23	Stewart St/Yale Ave	B	13.6	– <sup>5</sup>	B	15.5	– <sup>5</sup>
24	Howell St/Yale Ave	E	68.9	1.09	F	>120.0	1.34

1. Level of service, based on 2000 HCM methodology.

2. Average delay per vehicle, in seconds.

3. V/C = Volume-to-capacity ratio for signalized intersections, WM= worst movement/approach for unsignalized intersections.

4. Based on the v/c ratio of greater than 1.20, vehicle delay at this intersection may be greater than reported in the table.

5. Intersection runs on controller at Stewart/Denny; resulting v/c ratio not applicable to this intersection.

\* Unsignalized intersection

As shown in Tables 4 and 5, 2010 intersection levels of service within the study area are expected to change at a number of study intersections between Existing and 2010 *Alternative 1* (No Action) initial phase conditions. The changes are the result of a combination of factors, including background traffic growth and the addition of pipeline project traffic. Also, changes in intersection LOS at study intersections on Westlake Ave. N. and Terry Ave. N. can be attributed in part to the changes proposed as part of the streetcar project which would convert Westlake Ave. N. to two-way operations and a portion of Terry Ave. N to one-way operations. The following list summarizes the two study intersections that would continue to operate poorly under *Alternative 1* (No Action) initial phase conditions and the five study intersections where the LOS is expected to degrade to LOS E or F between the Existing and *Alternative 1* (No Action) initial phase conditions. They include:

**#7. Mercer St./Dexter Ave. N.** This intersection would continue to operate at LOS E during the PM peak hour. This is the result of increased background and pipeline traffic volumes.

**#9. Mercer St./Westlake Ave. N.** This intersection would degrade from LOS B to LOS F during the PM peak hour. This is the result of a combination of the conversion of Westlake Ave. N to two-way operations to accommodate the proposed streetcar and increased background and pipeline traffic volumes.

**#10. Mercer St./Fairview Ave. N.** This intersection would continue to operate at LOS F during the AM peak hour, and would degrade from LOS E to LOS F during the PM peak hour. This intersection would continue to operate at a poor LOS as a result of high traffic volumes and its proximity to I-5. Delays at this intersection would increase as a result of background traffic growth and pipeline project trips accessing I-5 via this intersection.

**#18. Denny Way/Aurora Ave. N.** This intersection would degrade from LOS E to LOS F during the PM peak hour. Poor PM peak hour operations at this intersection would continue due to the intersection providing access to/from Aurora Ave. N., and high traffic volumes on Denny Way. Intersection delay would increase as a result of the combination of growth in background traffic volumes and pipeline project traffic.

**#21. Denny Way/Fairview Ave. N.** This intersection would degrade from LOS D to LOS E during the PM peak hour. This reduction in LOS can be attributed to the intersections proximity to I-5, and increases in background traffic volumes and the addition of pipeline traffic volumes which access I-5 via Denny Way.

**#22. Denny Way/Stewart Ave. N.** This intersection would degrade from LOS D to LOS F during the AM peak hour. This reduction in LOS can be attributed to the intersections proximity to I-5, and increases in background traffic volumes and the addition of pipeline traffic volumes which exit I-5 at this intersection.

**#24. Yale Ave./Howell St.** This intersection would degrade from LOS D to LOS E during the AM peak hour, and from LOS E to LOS F during the PM peak hour. This intersection provides access to I-5 from the South Lake Union and Denny Triangle neighborhoods. Increased background traffic volumes and the addition of pipeline project trips result in degraded conditions by 2010.

The signalized intersections of Fairview Ave. N./Mercer St. (AM and PM peak hours), and Howell St./Yale Ave (PM peak hour) are forecast to have entering volumes that exceed capacity by close to 20 percent (a volume-to-capacity (v/c) ratio exceeding 1.20). At a v/c ratio of greater than 1.20, calculated vehicle delays become increasingly inaccurate. This is due to the sensitivity of the vehicle delay equation at high v/c ratios and, as a result, the vehicle delay exponentially increases. Thus, changes in LOS and operations are best measured by the v/c ratio and delay is reported as greater than 120 seconds to indicate this condition.

Locations where intersection operations shown in Tables 4 and 5 improve between existing conditions and the *Alternative 1* (No Action) initial phase can be attributed to the optimization of signal timing and roadway modifications made to reflect anticipated 2010 conditions.

## Transit & Rail

Transit operations in the study area have not changed as a result of the closure of the downtown Bus Tunnel (September 2005). This shift from Bus Tunnel to surface street operations has not changed the overall degree of transit accessibility for the site vicinity. The number of routes and the frequency of routes traveling through downtown and near the project site are similar to conditions prior to the Bus Tunnel closure.

Bus service is anticipated to return to the Tunnel during Fall 2007, with light rail service in the tunnel anticipated to begin during 2009. In addition, while bus transit headways are expected to be increased, overall transit service headways are expected to be reduced through Downtown since rail service will attract a portion of transit ridership.

It is not anticipated that any changes are likely to be made to the existing Seattle Center Monorail which would result in operations being significantly different than those documented above for existing conditions.

As stated in the *Planned Improvements* portion of this section, the South Lake Union Streetcar is anticipated to be complete by 2007, and would improve transit connectivity through the study area. This is anticipated to increase transit travel within the study area compared to 2005 existing levels.

### **Non-Motorized Facilities**

As stated in the *Planned Improvements* portion of this section, no changes to the non-motorized facilities within the study area are anticipated by 2010. While non-motorized travel is anticipated to increase within the study area compared to 2005 existing levels, existing non-motorized facilities are anticipated to accommodate anticipated growth.

### **Safety**

There would be a slight increase in the potential for traffic accidents at the study intersections proportionate to the increase in traffic due to background and pipeline traffic growth that would occur by 2010. Therefore, it is possible that the proportionate increase in traffic at the intersections of Mercer St/5<sup>th</sup> Avenue, Mercer St/9<sup>th</sup> Avenue, and Denny Way/Westlake Ave. N. may impact the existing safety hazard at these HAL locations.

### **Parking**

Parking supply in the project vicinity and on the project site is expected to remain consistent to the existing conditions documented in the *Affected Environment* portion of this section. No changes to on-street parking supply are identified by SDOT in the site vicinity. Similarly, the *Alternative 1* (No Action) initial phase would maintain current on-site parking supply for the existing uses. In addition, the proposed 1,038 stall Seattle Center Parking Garage is anticipated to be complete by 2010.

## **Alternative 2 Initial Phase**

This section documents traffic conditions within the study area if development were to occur according to the initial phase of the *Alternative 2* initial phase.

The *Alternative 2* initial phase would include the re-development of the existing Seattle Center surface parking lot bounded by Aurora Ave N. on the east, Mercer St. on the north, Harrison St. on the south, and 5<sup>th</sup> Avenue N. on the west.

Buildings containing approximately 420,000 sq. ft. of above-grade development is proposed for the *Alternative 2* initial phase. It is anticipated that the principal use of the structures would be office space for foundation employees and visitors. While the current site design plans reflect approximately 420,000 sq. ft. of building area, 450,000 sq. ft. was used as the basis of the traffic analysis herein. This assures that impacts disclosed will not be underestimated, since 450,000 sq. ft. is approximately 7 percent higher than the current design proposal. This also assumes that, to the

extent that minor design changes evolve over time, the analysis of traffic impacts based on 450,000 sq. ft. will remain a valid disclosure.

It is noted that impacts related to parking are based on the currently proposed 420,000 sq. ft project area.

On-site parking is proposed for approximately 204 vehicles. Access to the on-site parking garage would be provided from 5<sup>th</sup> Avenue N and Republican Street through the proposed Seattle Center parking garage, and from the proposed right-in/right-out driveway on Mercer Street. Truck loading and service bays for this phase of campus development would be accessed from 5<sup>th</sup> Avenue N.

## Street System

No off-site modifications to street channelization or intersection control are proposed as part of *Alternative 2* initial phase. Development associated with *Alternative 2* initial phase would improve existing sidewalks on the site frontage along Mercer Street, Harrison Street and 5<sup>th</sup> Avenue N.

## Traffic Generation

The trip generation for the proposed development is based on the Institute of Transportation Engineers' (ITE) *Trip Generation*<sup>3</sup> methodology and local mode-split data in the South Lake Union area. Weekday average daily, AM peak hour, and PM peak hour trip generation by the proposed development were estimated. Three steps were taken to estimate project trip generation; each is described below.

- ITE Office Data -- Trip rates from Trip Generation were used to determine a standard vehicular trip generation for office use. Vehicle trip generation was then adjusted based on typical ITE mode-split data for office to estimate trip generation in terms of person-trips. ITE identifies a 95-percent share for single occupancy vehicles (SOV), with the remaining person trips generated by carpool, transit, or non-vehicular trips. The high SOV share is due to the fact that most of the trip generation studies conducted for ITE were conducted in suburban areas, which typically have lower densities and minimal transit service.

To account for the more urban setting of the project than is reflected in the published ITE data, an Average Vehicle Occupancy (AVO) rate of 1.2 was assumed. The AVO rate was applied to the vehicle trip generation to estimate person trip generation.

- This mode-split data together with other existing transit ridership data was then used to establish a baseline mode-split that is felt to be representative for all non-CTR employment in the South Lake Union area. The following baseline mode-split values for the proposed development represent unmitigated values prior to implementation of a Transportation Management Program (TMP):

Transit/Bike/Walk:	10%
Carpool/Vanpool:	10%
SOV:	80%

- These values were applied to the Steps 1 and 2 trip generation estimates, which convert person-trips to vehicular trip generation based on local mode-split data. The resulting vehicle trip generation using local mode-split data is about 9 to 10 percent less than trip

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<sup>3</sup> ITE, 2003.

generation using ITE data for mostly suburban office uses. The resulting traffic generated by the proposal as shown in Table 6. The detailed calculation worksheets are provided in Attachment C.

As shown in Table 6, the *Alternative 2* initial phase, 450,000 square-feet, would generate approximately 3,635 daily trips. During the weekday AM peak hour, the *Alternative 2* initial phase would generate approximately 680 trips. During the weekday PM peak hour, the *Alternative 2* initial phase would generate approximately 640 trips.

**Table 6. 2010 Initial Phase Net New Trip Generation – *Alternative 2***

Time Period	Daily	AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
Initial Phase Alternative 2	3,635	635	45	680	65	575	640

## Distribution and Assignment

Traffic associated with the *Alternative 2* initial phase is expected to distribute to the surrounding local and regional facilities according to the percentages outlined in Table 7. This distribution pattern assumes peak hour project traffic would be primarily oriented to the regional transportation facilities in the area, particularly north and southbound I-5. Other primary routes would include 5<sup>th</sup> Ave. N., Westlake Ave. N., Fairview Ave. N., and Eastlake Ave. E. for local north/south traffic, SR 99 for regional north/south travel, and the Denny Way and Mercer Street corridors for travel east or west of the site.

The study area distribution patterns were derived based on the City of Seattle's Travel Demand Model (emme/2) model distribution patterns provided by SDOT and supplemented by model distribution data based on the regional PSRC emme/2 travel demand model. The trip distribution travel patterns to/from roads nearby the site were based on existing travel patterns and existing one-way street operations.

The inbound and outbound distribution patterns shown in Figures 6 and 7 were used to assign AM and PM peak hour traffic associated with the *Alternative 2* initial phase to the study area roadways and intersections. The assigned project trips for each block are illustrated in Figure 8.

**Table 7. Project Trip Distribution**

Route (To / From)	Percent
I-5 North (including SR 520)	20%
I-5 South (including I-90)	20%
SR 99 (Aurora) North	10%
SR 99 (Aurora) South	10%
Westlake North	5%
Eastlake North	5%
Mercer/Broad Street West	5%
Denny Way West	5%
Denny Way East	5%
Boren Ave South	5%
Westlake/9 <sup>th</sup> /Bell South	10%
<b>TOTAL</b>	<b>100%</b>

## Traffic Volume Impacts

Peak hour traffic volumes for the *Alternative 2* initial phase were developed by assigning the project-generated trips to the *Alternative 1* (No Action) initial phase peak hour traffic volumes at the study intersections. The resulting 2010 traffic volumes for the *Alternative 2* initial phase are illustrated in Figure 9. These volumes were then compared with the *Alternative 1* (No Action) initial phase traffic volumes. Tables 8 and 9 illustrate the percent impact of traffic generated by the *Alternative 2* initial phase at the study area intersections during weekday AM and PM peak hours.

Beyond the immediate study area, traffic generated by the *Alternative 2* initial phase would account for less than ten percent of the total entering traffic during the AM and PM peak hours. The portion of the study area bounded by 5<sup>th</sup> Ave. N., Harrison St., and Mercer St. would experience the greatest traffic impact, ranging from approximately 4 to 25 percent. This is due to their close proximity to the project sites.

During the weekday AM peak hour, the project impact at the most congested intersections range from 0.3 percent (5 trips) at the Howell St./Yale Ave. N. intersection, to 4.3 percent (168 trips) at the intersection of Denny Way/Aurora Ave. Peak hour traffic volumes typically vary on a daily basis and have been documented to fluctuate as high as 5 percent, yet the fluctuation is usually unnoticeable from a driver's perspective.

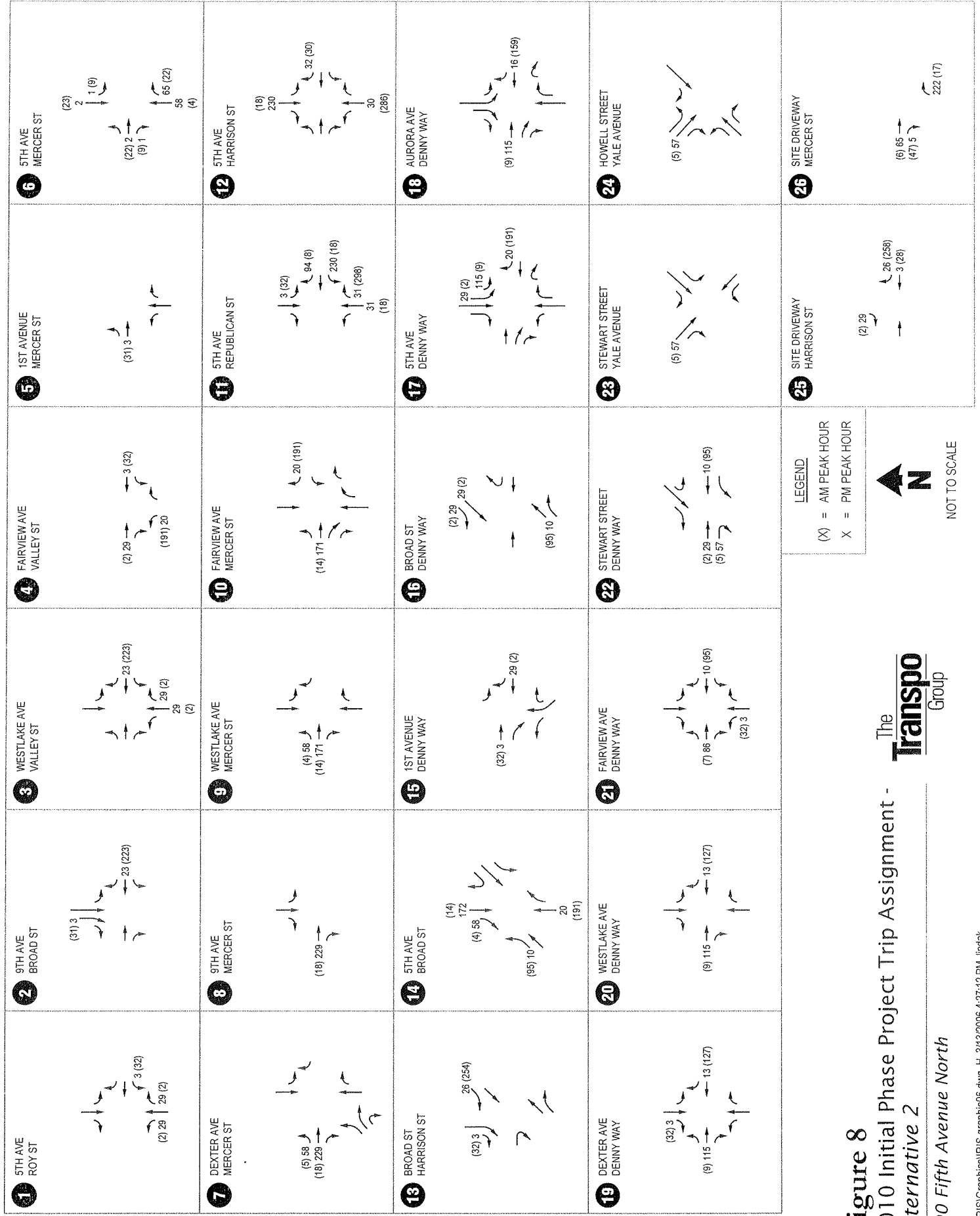
During the weekday PM peak hour, the project impact at the most congested intersections would be fewer than 5 percent with one exception. The intersection of Dexter Ave/Mercer St would be impacted by 7.4 percent (287 trips).

The percentages identified in Tables 8 and 9 show that the impacts of the *Alternative 2* initial phase would fall within the range of fluctuation that occurs as a result of background traffic at the majority of study intersections. For those intersections closest to the project sites that have a 4 to 25 percent impact, intersection operations were evaluated to determine whether additional measures would be needed to mitigate impacts of the *Alternative 2* initial phase, as described in the following sections.









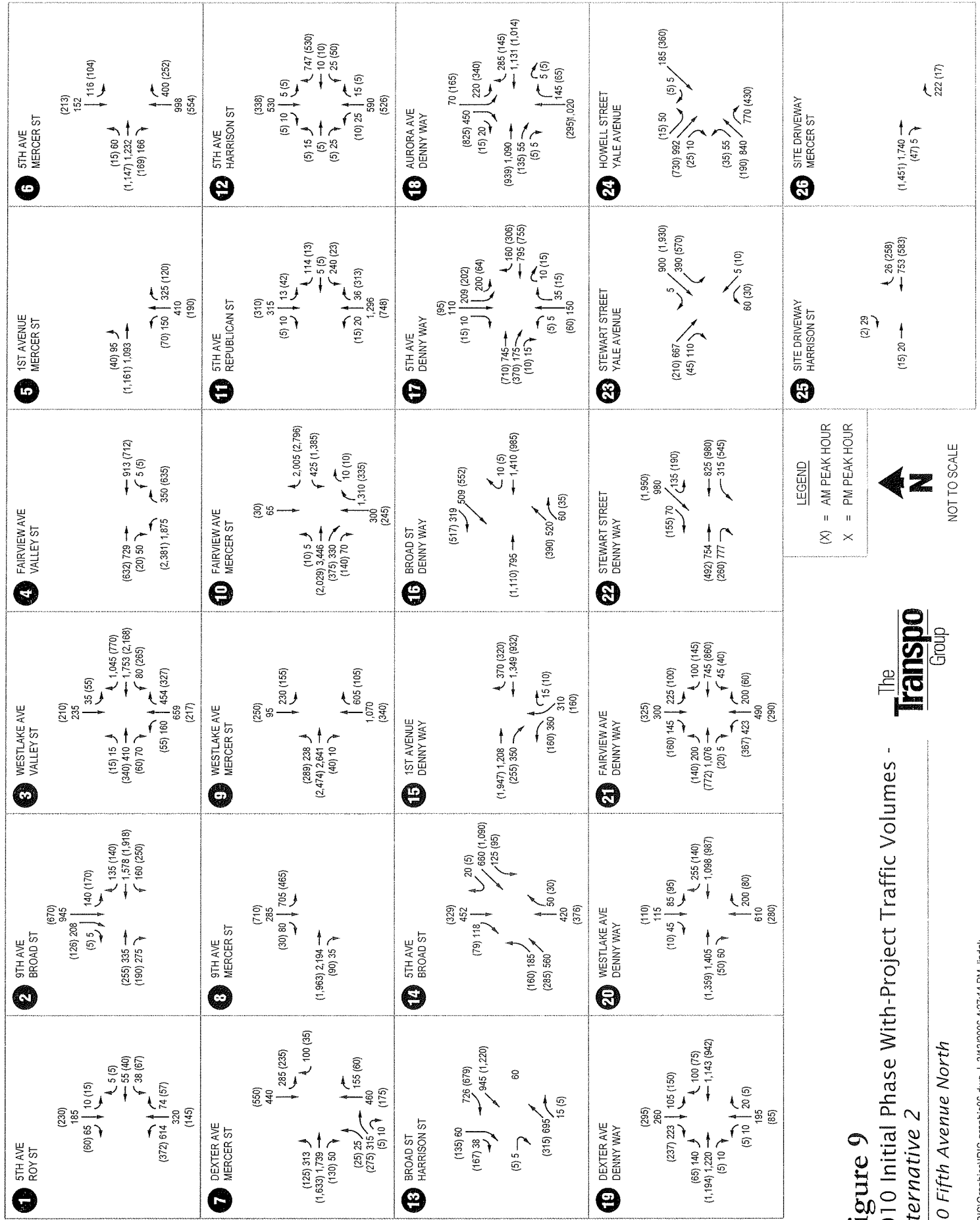
**LEGEND**  
 (X) = AM PEAK HOUR  
 X = PM PEAK HOUR



NOT TO SCALE

**Figure 8**  
 2010 Initial Phase Project Trip Assignment -  
 Alternative 2  
 500 Fifth Avenue North





**Table 8. 2010 Initial Phase AM Peak Hour Percent Project Impact – *Alternative 2***

Intersection		Alternative 1 (No Action)	Alternative 2 Project Traffic	% Project Impact
1	5 <sup>th</sup> Ave/Roy St	955	36	3.6%
2	9 <sup>th</sup> Ave/Broad St	3,470	254	6.8%
3	Westlake Ave/Valley St	4,255	227	5.1%
4	Fairview Ave/Valley St	4,160	225	5.1%
5	1 <sup>st</sup> Ave/Mercer St	1,550	31	2.0%
6	5 <sup>th</sup> Ave/Mercer St	2,365	89	3.6%
7	Dexter Ave/Mercer St	3,225	23	0.7%
8	9 <sup>th</sup> Ave/Mercer St	3,240	18	0.6%
9	Westlake Ave/Mercer St	3,635	18	0.5%
10	Fairview Ave/Mercer St	7,150	205	2.8%
11	5 <sup>th</sup> Ave/Republican	1,100	374	25.4%
12	5 <sup>th</sup> Ave/Harrison St	1,160	334	22.4%
13	Broad St/Harrison St*	2,240	286	11.3%
14	5 <sup>th</sup> Ave/Broad St	2,145	304	12.4%
15	1 <sup>st</sup> Ave/Denny Way	3,750	34	0.9%
16	Broad St/Denny Way	3,495	99	2.8%
17	5 <sup>th</sup> Ave/Denny Way	2,420	193	8.0%
18	Aurora Ave/Denny Way	3,780	168	4.3%
19	Dexter Ave/Denny Way	2,890	168	5.5%
20	Westlake Ave/Denny Way	2,975	136	4.4%
21	Fairview Ave/Denny Way	3,145	134	4.1%
22	Stewart St/Denny Way	4,470	102	2.2%
23	Stewart St/Yale Ave	2,790	5	0.2%
24	Howell St/Yale Ave	1,785	5	0.3%

**Table 9. 2010 Initial Phase PM Peak Hour Percent Project Impact – *Alternative 2***

Intersection		Alternative 1 (No Action)	Alternative 2 Project Traffic	% Project Impact
1	5 <sup>th</sup> Ave/Roy St	1,305	61	4.5%
2	9 <sup>th</sup> Ave/Broad St	3,755	26	0.7%
3	Westlake Ave/Valley St	4,835	81	1.6%
4	Fairview Ave/Valley St	3,870	52	1.3%
5	1 <sup>st</sup> Ave/Mercer St	2,070	3	0.1%
6	5 <sup>th</sup> Ave/Mercer St	2,995	129	4.1%
7	Dexter Ave/Mercer St	3,605	287	7.4%
8	9 <sup>th</sup> Ave/Mercer St	3,070	229	6.9%
9	Westlake Ave/Mercer St	4,660	229	4.7%
10	Fairview Ave/Mercer St	7,775	191	2.4%
11	5 <sup>th</sup> Ave/Republican	1,660	389	19.0%
12	5 <sup>th</sup> Ave/Harrison St	1,705	292	14.6%
13	Broad St/Harrison St*	2,515	29	1.1%
14	5 <sup>th</sup> Ave/Broad St	2,330	260	10.0%
15	1 <sup>st</sup> Ave/Denny Way	3,930	32	0.8%
16	Broad St/Denny Way	3,555	68	1.9%
17	5 <sup>th</sup> Ave/Denny Way	2,455	164	6.3%
18	Aurora Ave/Denny Way	4,365	131	2.9%
19	Dexter Ave/Denny Way	3,295	131	3.8%
20	Westlake Ave/Denny Way	3,745	128	3.3%
21	Fairview Ave/Denny Way	3,855	99	2.5%
22	Stewart St/Denny Way	3,760	96	2.5%
23	Stewart St/Yale Ave	2,080	57	2.7%
24	Howell St/Yale Ave	2,850	57	2.0%

## Traffic Operations Impacts

Traffic operations impacts include the consideration of changes in operations of study area intersections, as well as at the proposed site access at the points where it interfaces with abutting streets. This section also evaluates area-wide concurrency based on the City's screenline analysis.

### *Intersection Level of Service*

Tables 10 and 11 provide a summary of the *Alternative 2* initial phase weekday AM and PM peak hour levels of service, respectively, for each block. For purposes of comparison, *Alternative 1* (No Action) initial phase levels of service are also provided.

Five of the signalized study intersections will continue to operate at LOS F with or without the *Alternative 2* initial phase. Project impacts to these locations are summarized below in terms of traffic volume impacts. When an intersection reaches LOS F, vehicle delay calculations are sensitive and may not provide a reliable measure of project impacts.

**#9. Mercer St./Westlake Ave. N.** This intersection would continue to operate at LOS F during the PM peak hour. Project traffic accounts for less than 5.0 percent of the PM peak hour entering volumes at this intersection. The South Lake Union Transportation Study has identified solutions to address both the existing and future operational deficiencies at this intersection.

**#10. Mercer St./Fairview Ave. N.** This intersection would continue to operate at LOS F with significant vehicle delay during both the AM and PM peak hours. Project traffic accounts for 2.5 percent or less of the peak hour entering traffic volumes at this location. The South Lake Union Transportation Study has identified solutions to address both the existing and future operational deficiencies at this intersection.

**#18. Aurora Ave/Denny Way.** This intersection would continue to operate at LOS F during the PM peak hour. Project traffic accounts for less than 3.0 percent of the PM peak hour entering volumes at this intersection.

**#22. Stewart St./Denny Way.** This intersection would continue to operate at LOS F during the AM peak hour. Project traffic accounts for 2.2 percent of the AM peak hour entering volumes at this intersection. Improvement options are limited due to capacity restraints and its close proximity to the I-5 entrance and exit.

**#24. Howell St./Yale Ave.** This intersection would continue to operate at LOS F during the PM peak hour. Project traffic accounts for 2.0 percent of the PM peak hour entering volumes at this intersection. Improvement options are limited due to capacity restraints and high traffic volumes entering I-5.

In addition to the intersections which are anticipated to operate at LOS F with or without *Alternative 2* initial phase, three of the signalized study intersections will continue to operate at LOS E with or without the *Alternative 2* initial phase.

**#7. Mercer St./Dexter Ave. N.** This intersection would continue to operate at LOS E during the PM peak hour. Project traffic accounts for 7.4 percent of the PM peak hour entering volumes at this intersection. The South Lake Union Transportation Study has identified solutions to address both the existing and future operational deficiencies at this intersection.

**#21. Fairview Ave./Denny Way.** This intersection would continue to operate at LOS E during the PM peak hour. Project traffic accounts for approximately 2.5 percent of the PM peak hour entering volumes at this intersection.

**#24. Howell St./Yale Ave.** This intersection would continue to operate at LOS E during the AM peak hour. Project traffic accounts for less than 1 percent of the AM peak hour entering volumes at this intersection. Improvement options are limited due to capacity restraints and high traffic volumes entering I-5.

During the AM peak hour, the addition of traffic generated by *Alternative 2* would cause the level of service at the following intersections to degrade:

- #2. 9<sup>th</sup> Ave/Broad St (LOS C to LOS D)
- #3. Westlake Ave/Valley St (LOS C to LOS D)
- #4. Fairview Ave/Valley St (LOS C to LOS D)
- #18. Aurora Ave/Denny Way (LOS D to LOS E)
- #21. Fairview Ave/Denny Way (LOS C to LOS D)

**#18. Aurora Ave/Denny Way.** This intersection would degrade operations from LOS D to LOS E during the AM peak hour. Average intersection delay at this intersection would increase by approximately 15 seconds as a result of the addition of approximately 168 project trips representing 4.3 percent of total traffic.

The Washington State Department of Transportation (WSDOT) and City of Seattle, as part of the larger Alaskan Way Viaduct replacement solution, are currently evaluating changes to SR 99 through the South Lake Union Neighborhood. The current proposal would lower SR 99 between Roy Street and Denny Way, and would reconnect several streets across SR 99, including Republican Street, Harrison Street, and Thomas Street.

In addition, the connections between SR 99 and the surface street network would be modified to provide additional access points at Roy Street and Republican Street. The Alaskan Way Viaduct project is not anticipated to be complete until beyond 2010, so was not included in the evaluation of project impacts for the *Alternative 2* initial phase. However, when complete, the Alaskan Way Viaduct project could relieve congestion at the Aurora Ave/Denny Way intersection, through the provision of the additional access ramps.

The remaining study intersections would operate at the same level of service as with the *Alternative 1* (No Action) initial phase during the AM peak hour.

During the PM peak hour, the addition of project traffic associated with the *Alternative 2* initial phase would cause the LOS at the following intersections to degrade:

- #3. Westlake Ave/Valley St (LOS D to LOS E)
- #11. 5<sup>th</sup> Ave/Republican St (LOS A to LOS B)
- #14. 5<sup>th</sup> Ave/Broad St (LOS C to LOS B)
- #17. 5<sup>th</sup> Ave/Denny Way (LOS B to LOS C)
- #22. Stewart St/Denny Way (LOS D to LOS E)

**#3. Westlake Ave./Valley St.** This intersection is forecast to operate at LOS E in the PM peak hour with the *Alternative 2* initial phase, compared to LOS D with the *Alternative 1* (No Action) initial phase. Average intersection delay at this intersection would increase by approximately 6 seconds as a result of the addition of approximately 81 project trips representing 1.6 percent of total traffic.

**#22. Stewart St./Denny Way.** This intersection is forecast to operate at LOS E in the PM peak hour with the *Alternative 2* initial phase, compared to LOS D with the *Alternative 1* (No Action) initial phase. This intersection serves as the gateway to downtown Seattle from I-5 and currently operates, and will continue to operate at LOS F during the AM peak hour.

The remaining study intersections would operate at the same level of service as with the *Alternative 1* (No Action) initial phase during the PM peak hour.

**Table 10. 2010 Initial Phase AM Peak Hour LOS Summary – *Alternative 2***

#	Intersection	Alternative 1 (No Action)			Alternative 2		
		LOS <sup>1</sup>	Delay <sup>2</sup>	V/C or WM <sup>3</sup>	LOS	Delay	V/C or WM
1	5 <sup>th</sup> Ave/Roy St	C	26.5	0.51	C	27.1	0.53
2	9 <sup>th</sup> Ave/Broad St	C	29.5	0.95	D	44.0	1.03
3	Westlake Ave/Valley St	C	23.7	0.88	D	41.8	0.95
4	Fairview Ave/Valley St	C	33.2	0.86	D	35.6	0.91
5	1 <sup>st</sup> Ave/Mercer St	B	14.2	0.50	B	14.4	0.51
6	5 <sup>th</sup> Ave/Mercer St	D	43.5	0.45	D	44.8	0.46
7	Dexter Ave/Mercer St	D	44.1	0.82	D	44.8	0.82
8	9 <sup>th</sup> Ave/Mercer St	C	27.6	0.76	C	27.5	0.77
9	Westlake Ave/Mercer St	C	21.7	0.81	C	22.9	0.81
10	Fairview Ave/Mercer St	F	>120.0	1.25	F	>120.0	1.34
11	5 <sup>th</sup> Ave/Republican	A	9.7	0.18	A	7.5	0.28
12	5 <sup>th</sup> Ave/Harrison St	C	34.2	0.36	C	31.4	0.46
13	Broad St/Harrison St*	C	19.0	EB	C	22.5	EB
14	5 <sup>th</sup> Ave/Broad St	D	47.6	0.53	D	47.3	0.61
15	1 <sup>st</sup> Ave/Denny Way	B	14.8	0.81	B	15.6	0.82
16	Broad St/Denny Way	C	20.4	0.76	C	20.8	0.76
17	5 <sup>th</sup> Ave/Denny Way	B	13.1	0.60	B	13.7	0.61
18	Aurora Ave/Denny Way	D	45.3	0.92	E	60.1	0.96
19	Dexter Ave/Denny Way	B	15.9	0.67	B	17.1	0.69
20	Westlake Ave/Denny Way	B	14.5	0.68	B	14.6	0.68
21	Fairview Ave/Denny Way	C	34.7	0.80	D	40.5	0.85
22	Stewart St/Denny Way	F	90.7	1.14	F	97.3	1.12
23	Stewart St/Yale Ave	A	5.2	– <sup>5</sup>	A	5.3	– <sup>5</sup>
24	Howell St/Yale Ave	E	66.7	1.04	E	68.3	1.05

1. Level of service, based on 2000 HCM methodology.

2. Average delay per vehicle, in seconds.

3. V/C = Volume-to-capacity ratio for signalized intersections, WM= worst movement/approach for unsignalized intersections.

4. Based on the v/c ratio of greater than 1.20, vehicle delay at this intersection may be greater than reported in the table.

5. Intersection runs on controller at Stewart/Denny; resulting v/c ratio not applicable to this intersection.

\* Unsignalized intersection

As Tables 10 and 11 indicate, the addition of project traffic increases delay at the majority of study intersections, which is typical when intersection volumes increase. However at seven study intersections (#11 and #12 during the AM peak hour, #7, #13, and #15 during the PM peak hour, and #8 and #14 during both the AM and PM peak hours) the v/c ratio typically increases while the delay decreases compared to the *Alternative 1* (No Action) initial phase. This is the result of project trips being added to the non-critical movements at these intersections, which in turn results in reduced average vehicle delays for the intersection overall.

**Table 11. 2010 Initial Phase PM Peak Hour LOS Summary – *Alternative 2***

#	Intersection	Alternative 1 (No Action)			Alternative 2		
		LOS <sup>1</sup>	Delay <sup>2</sup>	V/C or WM <sup>3</sup>	LOS	Delay	V/C or WM
1	5 <sup>th</sup> Ave/Roy St	C	20.1	0.66	C	22.7	0.69
2	9 <sup>th</sup> Ave/Broad St	C	25.4	0.92	C	25.5	0.93
3	Westlake Ave/Valley St	D	50.6	1.16	E	56.8	1.18
4	Fairview Ave/Valley St	C	28.9	0.77	C	29.4	0.79
5	1 <sup>st</sup> Ave/Mercer St	B	19.0	0.63	B	19.0	0.64
6	5 <sup>th</sup> Ave/Mercer St	C	26.5	0.63	C	26.8	0.65
7	Dexter Ave/Mercer St	E	68.3	1.04	E	68.1	1.10
8	9 <sup>th</sup> Ave/Mercer St	C	30.2	0.69	C	30.1	0.73
9	Westlake Ave/Mercer St	F	106.2	1.09	F	>120.0	1.14
10	Fairview Ave/Mercer St	F	>120.0	1.35	F	>120.0	1.39
11	5 <sup>th</sup> Ave/Republican	A	3.4	0.31	B	11.0	0.49
12	5 <sup>th</sup> Ave/Harrison St	C	30.2	0.58	C	30.3	0.61
13	Broad St/Harrison St*	C	18.0	EB	C	17.7	EB
14	5 <sup>th</sup> Ave/Broad St	C	21.4	0.55	B	19.6	0.56
15	1 <sup>st</sup> Ave/Denny Way	B	15.9	0.78	B	14.9	0.75
16	Broad St/Denny Way	C	20.6	0.71	C	21.6	0.73
17	5 <sup>th</sup> Ave/Denny Way	B	16.0	0.61	C	20.7	0.69
18	Aurora Ave/Denny Way	F	>120.0	1.13	F	>120.0	1.14
19	Dexter Ave/Denny Way	B	16.3	0.80	B	17.6	0.86
20	Westlake Ave/Denny Way	C	22.0	0.85	C	23.3	0.90
21	Fairview Ave/Denny Way	E	55.3	0.90	E	56.8	0.89
22	Stewart St/Denny Way	D	53.7	1.00	E	64.1	1.03
23	Stewart St/Yale Ave	B	15.5	– <sup>5</sup>	B	19.8	– <sup>5</sup>
24	Howell St/Yale Ave	F	>120.0	1.34	F	>120.0	1.39

1. Level of service, based on 2000 HCM methodology.

2. Average delay per vehicle, in seconds.

3. V/C = Volume-to-capacity ratio for signalized intersections, WM= worst movement/approach for unsignalized intersections.

4. Based on the v/c ratio of greater than 1.20, vehicle delay at this intersection may be greater than reported in the table.

5. Intersection runs on controller at Stewart/Denny; resulting v/c ratio not applicable to this intersection.

\* Unsignalized intersection

## Site Access

Three points of ingress and egress would be provided for the *Alternative 2* initial phase. As described previously, access to the Seattle Center Parking Garage would be provided via the signalized intersection of 5<sup>th</sup> Ave./Republican St., with a secondary access provided from Harrison St., via a right-in/right-out only driveway. Access to the parking structure beneath the *Alternative 2* initial phase is proposed to also be provided from the signalized intersection of 5<sup>th</sup> Ave./Republican St. via a subterranean connection through the Seattle Center Garage. A secondary, right-in/right-out only access to the parking structure beneath the *Alternative 2* initial phase is proposed to be provided from Mercer Street, in the vicinity of Taylor Avenue. A driveway currently exists in the vicinity of the proposed Mercer Street driveway. The existing driveway is only opened after events at Seattle Center when the surface parking lot has been heavily utilized, and provides right-turn only exit to Mercer Street. The proposed driveway, which will be open at all times, will allow right-turns to and from



Mercer Street. A LOS analysis was conducted for each site access intersections for the AM and PM peak hours.

Table 12 summarizes the weekday AM and PM peak hour levels of service for the site access intersections that would serve as access to the *Alternative 2* initial phase.

**Table 12. 2010 Initial Phase Driveway LOS Summary – *Alternative 2***

Intersection	Alternative 2		
	LOS <sup>1</sup>	Delay <sup>2</sup>	V/C or WM <sup>3</sup>
<b>AM Peak Hour</b>			
5 <sup>th</sup> Avenue/Republican St	A	7.5	0.28
South Driveway/Harrison St	B	10.6	SB
North Driveway/Mercer St	B	11.5	NB
<b>PM Peak Hour</b>			
5 <sup>th</sup> Avenue/Republican St	B	11.0	0.49
South Driveway/Harrison St	B	10.3	SB
North Driveway/Mercer St	C	17.7	NB

1. Level of service, based on 2000 HCM methodology.  
2. Average delay per vehicle, in seconds.  
3. V/C = Volume-to-capacity ratio for signalized intersections, WM= worst movement/approach for unsignalized intersections.

As shown in Table 12, all three site access intersections are estimated to operate at LOS C or better during both the AM and PM peak hours. The results indicate the site access intersections would provide adequate capacity for the *Alternative 2* initial phase.

In addition to the analysis of the site access intersections, vehicle queuing and individual movement levels of service were examined at the intersections directly adjacent to the site access intersections to determine how they interact with each other. During the AM peak hour the driveway approach at the 5<sup>th</sup> Ave/Republican St intersection would operate at LOS D, but with vehicle queues of approximately two vehicles. The Harrison Street driveway is anticipated to operate at LOS B during the AM peak hour, as shown in Table 12, with minimal vehicle queues on the driveway approach. However, it is anticipated that the westbound right-turn queue from the 5<sup>th</sup> Ave/Harrison St signal would extend beyond the driveway intersection, at times blocking the Harrison St driveway during the AM peak hour. No blocking issues are anticipated at the 5<sup>th</sup> Ave/Republican St intersection during the AM peak hour.

During the PM peak hour, the driveway approach to the 5<sup>th</sup> Ave/Republican St intersection is anticipated to operate at LOS C, however due to higher PM peak hour outbound traffic volumes, on-site vehicle queues are anticipated to extend for approximately 175 feet. As shown in Table 12, the Harrison Street driveway approach is anticipated to operate at LOS B with minimal vehicle queuing. The westbound queue from the 5<sup>th</sup> Ave/Harrison St intersection is anticipated to block the Harrison Street driveway during the PM peak hour, however, this queue is anticipated to be shorter during the PM peak hour than in the AM peak hour so would block the driveway less frequently and for shorter time periods. No blocking issues are anticipated at the 5<sup>th</sup> Ave/Republican St intersection during the PM peak hour.

## Transportation Concurrency

The City has implemented a Transportation Concurrency Project Review System to comply with one of the requirements of the Washington State Growth Management Act (GMA). The system, as

described in DCLU's Director's Rule 4-99<sup>4</sup> and the City's *Land Use and Zoning Code*, is designed to provide a mechanism that would determine whether adequate transportation facilities would be available "concurrent" with proposed development projects.

Five screenlines were chosen for review, based on their location in relationship to the project sites and estimated influence areas. The screenlines that were analyzed for concurrency review include the Magnolia and Ship Canal Bridges and South Lake Union, as shown in Table 13.

**Table 13. 2010 Initial Phase Concurrency Analysis – *Alternative 2***

SL <sup>1</sup> Number	Location	Direction <sup>2</sup>	Capacity	1998 Volume	V/C Standard	Alternative 2	
						Project Traffic	V/C
2	Magnolia	EB	4,480	2,130	1.00	6	0.48
		WB	4,480	2,820	1.00	51	0.64
5.12	Fremont Bridge	NB	2,000	2,070	1.20	26	1.05
		SB	2,000	1,270	1.20	2	0.64
5.13	Aurora Avenue	NB	4,950	4,908	1.20	51	1.00
		SB	4,950	3,195	1.20	9	0.65
5.16	University and Montlake Bridges	NB	4,300	3,820	1.20	152	0.92
		SB	4,300	3,630	1.20	15	0.85
8	South of Lake Union	EB	6,500	4,920	1.20	278	0.80
		WB	4,100	3,300	1.20	30	0.81

1. SL = Screen Line

2. Direction: NB = Northbound, SB = Southbound, EB = Eastbound, WB = Westbound

The transportation concurrency analysis indicates that with traffic generated by the *Alternative 2* initial phase, the screenlines would have v/c ratios that are less than the City level of service threshold and thus, the conditions would meet concurrency requirements.

## Transit Impacts

Without site specific programs like a Transportation Management Program (TMP) or Commute Trip Reduction (CTR), the transit mode split is expected to represent about 10 percent of total person trips generated by the *Alternative 2* initial phase. Under the *Alternative 2* initial phase, approximately 430 daily transit trips would be generated by the development. Of those, approximately 80 transit trips would occur during the AM peak hour and approximately 75 transit trips during the PM peak hour.

Through the implementation of a TMP program, transit ridership is anticipated to increase from 10 percent to between 15 and 30 percent. This would result in the *Alternative 2* initial phase generating up to 1,295 daily transit trips, with approximately 240 occurring during the AM peak hour, and 225 during the PM Peak hour.

Existing transit routes serving the site vicinity provide regular service. The nearest stops are located north and south of the site on 5<sup>th</sup> Ave. N., and along Aurora Ave. N. These stops serve Routes 3N, 4N, 5, 16, 26, 28, 82, and 358, providing service to Downtown Seattle, Rainier Beach, University District, Northgate, Lake City, Shoreline, White Center and other local and regional locations. From these stops, transit service can be taken to destinations throughout the region. South of the site on Broad St., Routes 3S, 4S, and 74 are served by a westbound stop near 5<sup>th</sup> Ave. N. In addition, it is

<sup>4</sup> Seattle DCLU, 1999

possible that some Foundation employees would likely use the existing Seattle Center Monorail to travel between the project site and downtown Seattle. However, no noticeable numbers of Foundation employees were assumed to use the proposed South Lake Union Streetcar, due to the distance between the two, and location of Aurora Avenue. All of the routes provide service during the morning and afternoon commuter peaks. Existing transit service is expected to accommodate the additional demand generated by the *Alternative 2* initial phase with or without a TMP program and, therefore, no significant adverse impacts to transit operations are expected to occur.

## **Non-Motorized Travel Impacts**

As part of the *Alternative 2* initial phase the existing sidewalks on each project site frontage would be improved. The *Alternative 2* initial phase would also provide secure bicycle storage on the project site.

Existing non-motorized facilities within the study area are expected to accommodate the portion of the *Alternative 2* initial phase trip generation that is expected to walk or bike to the project site. The *Alternative 2* initial phase would not degrade any existing facilities; the redevelopment would enhance those facilities directly adjacent to each site. Thus, no significant adverse impacts to non-motorized facilities or operations are expected to occur as a result of the *Alternative 2* initial phase of development.

## **Safety Impacts**

Adding *Alternative 2* initial phase traffic volumes to study intersections and roadways would likely cause a proportionate increase in the probability of traffic accidents. Therefore, it is possible that the proportionate increase in traffic at the intersections of Mercer St/5<sup>th</sup> Avenue, Mercer St/9<sup>th</sup> Avenue, and Denny Way/Westlake Ave. N. may impact the existing safety hazard at these HAL locations.

## **Parking Impacts**

The analysis of parking impacts associated with the initial phase is based on the development of 420,000 square-feet, compared with the 450,000 square-feet analyzed in the previous sections. The reduced square-footage used in the parking analysis is more representative of the current design for the initial phase, and reflects the desire for the project not to construct excess parking supply.

## **Code Requirements**

The City of Seattle parking code requires a minimum of 1.0 stall per 1,000 gsf office space. The minimum parking supply required by the *Alternative 2* initial phase to meet City of Seattle parking code requirements would be 420 stalls. As part of the initial phase of construction, 204 spaces would be built on-site. Seattle Center has agreed to provide 300 spaces for campus use by covenant. Of the 300 spaces, 54 would be allocated to the visitor learning center and retail located in the garage, with the remaining 246 spaces allocated to the campus. The proposed on-site parking stalls and the agreed leased stalls in the Seattle Center Parking Garage count towards meeting the code requirement. The on-site and covenanted parking supply, 450 stalls (204+246) for the *Alternative 2* initial phase would exceed the code requirement of 420 spaces.

## **Parking Supply**

On-site parking is proposed both below the *Alternative 2* initial phase building(s), and in the proposed Seattle Center Parking Garage. A total of approximately 204 parking stalls are proposed as part of the *Alternative 2* initial phase. In addition to the approximately 204 spaces being provided on-site, the Seattle Center has agreed to provide a covenant for 246 stalls in the Seattle Center Parking Garage

for exclusive daily use (up to 6:00 pm Monday through Friday) by the Foundation. For the *Alternative 2* initial phase a total parking supply of 450 parking stalls would be available.

### ***Parking Demand***

Parking demand for the *Alternative 2* initial phase was calculated considering the size, typical employee density, daily occupancy, and travel mode split of the proposed project. This component yields a demand for long-term commuter parking. The mode-split assumptions are consistent with those identified in the travel mode split section of the *Alternative 2* initial phase trip generation analysis, which was summarized previously in Table 6. In addition, short-term parking demand required by office use is also considered and is based on rates consistent with previously accepted rates for numerous other Seattle development projects. Calculation worksheets for the parking demand analysis are provided in Attachment D to this technical report.

Peak parking demand for the *Alternative 2* initial phase would total 1,033 parking stalls. Assuming a total of 450 parking spaces for the *Alternative 2* initial phase would have an effective supply of 95 percent, or 428 spaces, the peak demand would exceed supply by 605 parking stalls in the unmitigated scenario of the *Alternative 2* initial phase<sup>5</sup>. A Transportation Management Plan (TMP), as discussed in the Mitigation section, could reduce the parking demand by as much as 301 stalls. The calculation worksheets provided in Attachment D illustrate the effect of the TMP goals. Therefore, with a TMP in place, parking demand associated with the *Alternative 2* initial phase would not be able to be accommodated within the proposed parking supply. A review of parking utilization in the adjacent Seattle Center and Seattle School District parking facilities indicates that there is a sufficient weekday daytime parking supply is available on all but approximately three days per year.

**Table 14. Alternative 2 Initial Phase Parking Summary**

Alternative/Phase	Proposed Parking Supply	Parking Code Regulations	Practical Parking Supply <sup>1</sup>	Parking Demand	Parking Surplus/ Deficit <sup>2</sup>
Base Mode Split Assumptions					
Alternative 2 Initial Phase	450	420	428	1,033	-605
Moderate TMP Assumptions					
Alternative 2 Initial Phase	450	420	428	942	-514
Aggressive TMP Assumptions					
Alternative 2 Initial Phase	450	420	428	732	-304

1. Assumes a 5% reduction to account for the practical capacity of the parking supply.

2. A parking deficit is indicated by a negative number, a parking surplus is shown by a positive number.

### **Construction Impacts**

Construction of the *Alternative 2* initial phase, beginning in the first or second quarter of 2008, would generate truck and vehicle traffic associated with earthwork and excavation, delivery of materials to the site and similar types of activities. The highest concentration of truck traffic expected to occur during construction would coincide with the earthwork and excavation activities. Preliminary estimates indicate that approximately 150,000 to 190,000 cubic yards of material would be removed in conjunction with the *Alternative 2* initial phase. This is estimated to generate approximately 15,000 truck trips over an eight to sixteen week time frame. Given the estimated construction schedule, the amount of traffic would equate to between 200 and 400 trips per day, depending upon the number of

<sup>5</sup> The 428-space amount is based on the total 450 stalls reduced factored by a practical capacity factor that takes into account the efficiency lost by circulating the garage in search of a vacant stall.

weeks and the number of days per week which excavation would occur. Truck traffic would be substantially less during the remaining periods of construction. The amount of traffic associated with construction, however, is expected to be less than the total development related traffic volumes anticipated.

Construction employees would be required to park off-site in neighboring parking garages or parking lots (including the Seattle Center Parking Garage). Once on-site parking is completed and approved, some construction employees could park on-site for the duration of the construction.

While construction may cause inconveniences proximate to the site, the impacts would be temporary and are not expected to extend to the surrounding study area. To minimize potential impacts, specific routing plans and scheduling could be identified through a construction vehicle routing plan and coordination with SDOT.

### Alternative 3 Initial Phase

The development proposed to occur under the *Alternative 3* initial phase would include the same characteristics as the development identified for the *Alternative 2* initial phase. Therefore, the impact associated with the *Alternative 3* initial phase would be consistent with those documented above for the *Alternative 2* initial phase.

### Alternative 4 Initial Phase

The development proposed to occur under the *Alternative 4* initial phase would include the same characteristics as the development identified for the *Alternative 2* initial phase. It is not anticipated that the improvements planned for Mercer Street, 6<sup>th</sup> Avenue, or Aurora Avenue would be complete prior to 2010. Therefore, the impact associated with the *Alternative 4* initial phase would be consistent with those documented above for the *Alternative 2* initial phase.

### Area Transportation Impacts

Additional traffic generated by the initial phase *Alternatives* is not anticipated to cause any additional study intersections to degrade to LOS F with the addition of project traffic. However, the addition of project traffic volumes at those intersections which already operate at LOS F with the *Alternative 1* (No Action) initial phase may increase delay during the AM and PM peak hours.

A number of traffic and intersection improvements are proposed by the City of Seattle in the vicinity of the project site. Two intersection improvements proposed as part of the South Lake Union Transportation Plan, and one as part of the Alaskan Way Viaduct project would reduce the impacts of this project that were identified through the level of service analysis. The following list identifies the impact of the project and potential improvements at these intersections:

- **#9. Westlake Ave/Mercer St** (PM peak hour only) – this intersection would continue to operate at LOS F during the PM peak hour with or without the initial phase project *Alternatives*. Improvements for this intersection have been identified as part of the South Lake Union Transportation Plan.
- **#10. Fairview Ave/Mercer St** (AM and PM peak hours) – this intersection would continue to operate at LOS F during both the AM and PM peak hours with or without the initial phase project *Alternatives*. Improvements for this intersection have been identified as part of the South Lake Union Transportation Plan.

- **#18. Denny Way/Aurora Ave** (PM peak hour only) would continue to operate at LOS F during PM peak hour with or without the initial phase project *Alternatives*. Improvements for this intersection have been identified as part of the Aurora Avenue improvements included in the Alaskan Way Viaduct project, however this project is not anticipated to be completed prior to year 2010.

# Impacts of the 2025 Build-Out Project Alternatives

This section of the technical report describes the expected traffic and parking conditions within the study area for both of the build-out project alternatives. The impacts associated with the build-out of the project alternatives are evaluated for a horizon year of 2025.

## Alternative 1 Build-Out (No Action)

This section of the technical report describes expected traffic and parking conditions within the study area if no new development were to occur on the project site. The *Alternative 1* (No Action) build-out assumes that the existing land uses, structures, parking, and driveways would remain and provides a baseline for comparing each of the development alternatives. The traffic, circulation, and parking analysis for the *Alternative 1* (No Action) build-out was conducted for AM and PM peak hour conditions in the year 2025, consistent with the year of the *Alternative 2, 3, and 4* build-out.

## 2025 Planned Improvements

- Roadway Improvements - No additional planned improvements were identified beyond those documented in the 2010 initial phase section of this report, except the Alaskan Way Viaduct project could commence after 2010. As part of the larger Alaskan Way Viaduct replacement solution, WSDOT and the City of Seattle are currently evaluating changes to SR 99 through the South Lake Union Neighborhood. The current proposal would lower SR 99 between Roy Street and Denny Way, and would reconnect several streets across SR 99, including Republican Street, Harrison Street, and Thomas Street.
- Rail and Transit Improvements - No additional planned improvements were identified beyond those documented in the 2010 initial phase section of this report.
- Non-Motorized Improvements - No additional planned improvements were identified above and beyond those documented in the 2010 initial phase section of this report.

It is noted that some of the projects identified in the South Lake Union Transportation Plan, and components of the Alaskan Way Viaduct may be partially or fully constructed by 2025. However, funding is not currently assured, thus this analysis did not rely on these improvements, to be conservative. The exception to this is that the analysis of the *Alternative 4* build-out assumes the improvements planned for Mercer Street and Aurora Avenue in the design of the campus.

## Traffic Volumes

The 2025 AM and PM peak hour traffic volumes used in the analysis of the *Alternative 1* (No Action) are comprised of existing traffic, background traffic growth, and traffic generated from specific planned developments anticipated by the year 2025. To enable this document to identify all the impacts associated with the *Alternative 2, 3, and 4* build-out, the traffic generated by the *Alternative 2* initial phase was not included in 2025 *Alternative 1* (No Action) traffic volumes. The methodology used to estimate 2025 peak hour traffic volumes for the analysis of the project build-out is consistent with that used in the analysis of the initial phase. An annually compounded growth rate of 0.5 percent was applied to existing (year 2005) peak hour volumes to account for general traffic growth in the study area projected by the year 2025. In addition, AM and PM peak hour traffic generated by planned development projects, also called “pipeline projects,” were identified within the general vicinity.

The pipeline projects remain unchanged from those included in the analysis of the initial phase. However, to account for the more distant horizon year, and to reflect that additional, although currently unidentified pipeline projects would likely be constructed by 2025, the 25 percent reduction in pipeline project traffic was not taken for this analysis.

Adjustments were again made to account for the construction of the proposed South Lake Union streetcar project which is anticipated to be complete by 2007. As mentioned previously, the streetcar requires the conversion of Westlake to two-way operations, and the conversion of Terry to one-way northbound operations between Mercer and John Streets. Adjustments were made to local travel patterns to reflect these changes.

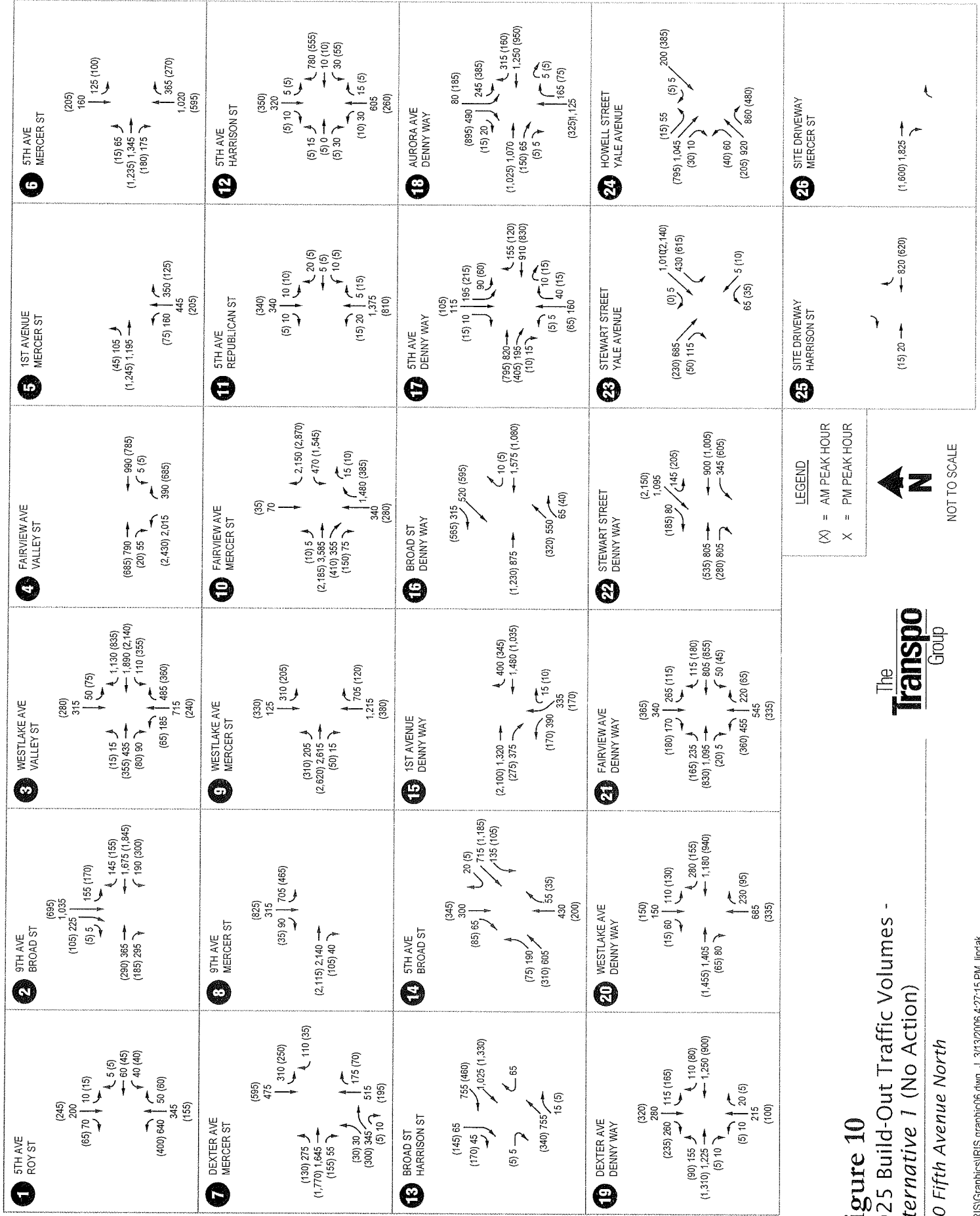
The peak hour traffic from pipeline projects, added together with the background 0.5 percent annual growth in existing traffic, and the adjustments made to reflect the changes proposed to accommodate the streetcar, result in estimated 2025 *Alternative 1* (No Action) traffic volumes. Figure 10 summarizes the traffic volumes that would occur during the AM and PM peak hour periods for the *Alternative 1* (No Action) in 2025.

## Traffic Operations

Weekday peak hour intersection levels of service (LOS) were calculated for each of the study intersections for the *Alternative 1* (No Action) build-out. Adjustments were made to the traffic operations analysis to reflect the proposed changes to the local street system to account for the construction of the proposed South Lake Union streetcar project which is anticipated to be complete by 2007. As mentioned previously, the streetcar requires the conversion of Westlake to two-way operations, and the conversion of Terry to one-way northbound operations between Mercer and John Streets. Adjustments were made to the local street system to reflect these changes for the LOS analysis.

At those study intersections not located along the proposed streetcar route, the intersection LOS analysis inputs (cycle length, number of lanes, phasing, etc.) remained unchanged from those used for the LOS analysis of existing conditions. The only exception is for intersections with actuated signals, in which case the green times were re-optimized based on the 2025 *Alternative 1* (No Action) weekday AM and PM peak hour traffic volumes. Tables 15 and 16 respectively provide a summary of AM and PM peak hour levels of service, delays, and v/c ratios at study intersections for the *Alternative 1* (No Action) build-out.





**Table 15. 2025 Build-Out AM Peak Hour LOS Summary – *Alternative 1* (No Action)**

#	Intersection	2005 Existing			2025 Alternative 1 (No Action)		
		LOS <sup>1</sup>	Delay <sup>2</sup>	V/C or WM <sup>3</sup>	LOS	Delay	V/C or WM
1	5 <sup>th</sup> Ave/Roy St	C	25.9	0.49	C	28.0	0.55
2	9 <sup>th</sup> Ave/Broad St	D	36.1	0.95	D	42.3	1.02
3	Westlake Ave/Valley St	B	11.2	0.51	D	35.2	1.11
4	Fairview Ave/Valley St	C	29.1	0.76	D	39.9	0.95
5	1 <sup>st</sup> Ave/Mercer St	B	13.5	0.45	B	15.1	0.56
6	5 <sup>th</sup> Ave/Mercer St	D	39.4	0.42	D	46.0	0.49
7	Dexter Ave/Mercer St	D	41.9	0.74	D	50.1	0.90
8	9 <sup>th</sup> Ave/Mercer St	B	19.7	0.71	D	39.2	0.84
9	Westlake Ave/Mercer St	A	8.1	0.62	C	26.8	0.90
10	Fairview Ave/Mercer St	F	87.3	1.07	F	>120.0	1.40
11	5 <sup>th</sup> Ave/Republican	A	8.8	0.16	A	9.9	0.20
12	5 <sup>th</sup> Ave/Harrison St	C	33.2	0.29	C	34.1	0.39
13	Broad St/Harrison St*	C	17.9	EB	C	20.9	EB
14	5 <sup>th</sup> Ave/Broad St	D	44.2	0.52	E	57.6	0.58
15	1 <sup>st</sup> Ave/Denny Way	B	12.2	0.75	C	23.2	0.88
16	Broad St/Denny Way	B	18.0	0.66	C	25.3	0.85
17	5 <sup>th</sup> Ave/Denny Way	B	13.3	0.53	B	13.9	0.66
18	Aurora Ave/Denny Way	C	27.8	0.75	F	80.6	1.02
19	Dexter Ave/Denny Way	B	14.0	0.51	B	18.1	0.81
20	Westlake Ave/Denny Way	A	7.1	0.51	B	18.8	0.80
21	Fairview Ave/Denny Way	C	28.5	0.63	D	51.1	0.91
22	Stewart St/Denny Way	D	45.2	0.99	F	>120.0	1.26
23	Stewart St/Yale Ave	A	4.5	– <sup>5</sup>	A	6.1	– <sup>5</sup>
24	Howell St/Yale Ave	D	48.1	0.91	F	94.6	1.18

1. Level of service, based on 2000 HCM methodology.

2. Average delay per vehicle, in seconds.

3. V/C = Volume-to-capacity ratio for signalized intersections, WM= worst movement/approach for unsignalized intersections.

4. Based on the v/c ratio of greater than 1.20, vehicle delay at this intersection may be greater than reported in the table.

5. Intersection runs on controller at Stewart/Denny; resulting v/c ratio not applicable to this intersection.

\* Unsignalized intersection

**Table 16. 2025 Build-Out PM Peak Hour LOS Summary – *Alternative 1 (No Action)***

#	Intersection	2005 Existing			2025 Alternative 1 (No Action)		
		LOS <sup>1</sup>	Delay <sup>2</sup>	V/C or WM <sup>3</sup>	LOS	Delay	V/C or WM
1	5 <sup>th</sup> Ave/Roy St	B	18.6	0.64	C	25.4	0.72
2	9 <sup>th</sup> Ave/Broad St	C	28.5	0.87	C	34.8	0.99
3	Westlake Ave/Valley St	B	17.4	0.94	F	85.6	1.28
4	Fairview Ave/Valley St	C	26.1	0.70	C	31.1	0.85
5	1 <sup>st</sup> Ave/Mercer St	B	17.9	0.60	C	20.9	0.69
6	5 <sup>th</sup> Ave/Mercer St	C	21.2	0.59	C	28.6	0.69
7	Dexter Ave/Mercer St	E	59.6	0.93	F	83.8	1.18
8	9 <sup>th</sup> Ave/Mercer St	C	33.3	0.72	C	31.0	0.74
9	Westlake Ave/Mercer St	B	19.8	0.75	F	>120.0	1.25
10	Fairview Ave/Mercer St	E	68.9	1.14	F	>120.0	1.50
11	5 <sup>th</sup> Ave/Republican	A	3.7	0.30	A	8.3	0.34
12	5 <sup>th</sup> Ave/Harrison St	B	19.8	0.48	C	31.7	0.63
13	Broad St/Harrison St*	C	17.3	EB	C	19.6	EB
14	5 <sup>th</sup> Ave/Broad St	C	21.8	0.53	C	22.1	0.60
15	1 <sup>st</sup> Ave/Denny Way	B	14.0	0.71	B	19.5	0.85
16	Broad St/Denny Way	B	20.4	0.60	C	22.5	0.79
17	5 <sup>th</sup> Ave/Denny Way	B	15.6	0.56	B	17.5	0.67
18	Aurora Ave/Denny Way	E	64.4	0.83	F	>120.0	1.26
19	Dexter Ave/Denny Way	B	15.1	0.64	C	26.3	0.93
20	Westlake Ave/Denny Way	B	13.4	0.60	C	36.1	1.02
21	Fairview Ave/Denny Way	D	36.6	0.69	E	77.4	1.01
22	Stewart St/Denny Way	C	30.8	0.84	F	87.2	1.12
23	Stewart St/Yale Ave	B	13.6	– <sup>5</sup>	C	21.6	– <sup>5</sup>
24	Howell St/Yale Ave	E	68.9	1.09	F	>120.0	1.51

1. Level of service, based on 2000 HCM methodology.

2. Average delay per vehicle, in seconds.

3. V/C = Volume-to-capacity ratio for signalized intersections, WM = worst movement/approach for unsignalized intersections.

4. Based on the v/c ratio of greater than 1.20, vehicle delay at this intersection may be greater than reported in the table.

5. Intersection runs on controller at Stewart/Denny; resulting v/c ratio not applicable to this intersection.

\* Unsignalized intersection

As shown in Tables 15 and 16, 2025 intersection levels of service within the study area are expected to change at a number of study intersections between existing conditions and the 2025 *Alternative 1 (No Action)*. The changes are the result of a combination of factors, including background traffic growth and the addition of pipeline project traffic. Also, changes in intersection LOS at study intersections on Westlake Ave. N. and Terry Ave. N. can be attributed in part to the changes proposed as part of the streetcar project which would convert Westlake Ave. N. to two-way operations and a portion of Terry Ave. N to one-way operations. The following list summarizes the two study intersections that would continue to operate poorly under the 2025 *Alternative 1 (No Action)* and the nine study intersections where the LOS is expected to degrade to LOS E or F between existing conditions and the 2025 *Alternative 1 (No Action)*. They include:

**#3. Westlake Ave./Valley St.** This intersection would degrade from LOS B to LOS F during the PM peak hour. This is the result of a combination of the conversion of Westlake Ave. N to two-way

operations to accommodate the proposed streetcar and increased background and pipeline traffic volumes.

**#7. Mercer St./Dexter Ave. N.** This intersection would degrade from LOS E to LOS F during the PM peak hour. This is the result of increased background and pipeline traffic volumes.

**#9. Mercer St./Westlake Ave. N.** This intersection would degrade from LOS B to LOS F during the PM peak hour. This is the result of a combination of the conversion of Westlake Ave. N to two-way operations to accommodate the proposed streetcar and increased background and pipeline traffic volumes.

**#10. Mercer St./Fairview Ave. N.** This intersection would continue to operate at LOS F during the AM peak hour, and would degrade from LOS E to LOS F during the PM peak hour. This intersection would continue to operate at a poor LOS as a result of high traffic volumes and its proximity to I-5. Delays at this intersection would increase as a result in background traffic growth and pipeline project trips accessing I-5 via this intersection.

**#14. 5<sup>th</sup> Ave. N./Broad St.** This intersection would degrade from LOS D to LOS E during the AM peak hour. This is the result of increased background and pipeline traffic volumes.

**#18. Denny Way/Aurora Ave. N.** This intersection would degrade from LOS C to LOS F during the AM peak hour, and from LOS E to LOS F during the PM peak hour. Poor peak hour operations at this intersection are attributable to the intersection providing access to/from Aurora Ave. N., and high traffic volumes on Denny Way, and as a result of the combination of growth in background traffic volumes and pipeline project traffic.

**#21. Denny Way/Fairview Ave. N.** This intersection would degrade from LOS D to LOS E during the PM peak hour. This reduction in LOS can be attributed to the intersection's proximity to I-5, and increases in background traffic volumes and the addition of pipeline traffic volumes which access I-5 via Denny Way.

**#22. Denny Way/Stewart Ave. N.** This intersection would degrade from LOS D to LOS F during the AM peak hour, and from LOS C to LOS F during the PM peak hour. This reduction in LOS can be attributed to the intersection's proximity to I-5, and increases in background traffic volumes and the addition of pipeline traffic volumes which exit I-5 at this intersection.

**#24. Yale Ave./Howell St.** This intersection would degrade from LOS D to LOS F during the AM peak hour, and from LOS E to LOS F during the PM peak hour. This intersection provides access to I-5 from the South Lake Union and Denny Triangle neighborhoods. Increased background traffic volumes and the addition of pipeline project trips result in degraded conditions by 2025.

As shown in Tables 15 and 16, several signalized intersections are forecast to have entering volumes that exceed capacity by close to 20 percent (a volume-to-capacity (v/c) ratio exceeding 1.20). At a v/c ratio of greater than 1.20, calculated vehicle delays become increasingly inaccurate. This is due to the sensitivity of the vehicle delay equation at high v/c ratios and, as a result, the vehicle delay exponentially increases. Thus, changes in LOS and operations are best measured by the v/c ratio and delay is reported as greater than 120 seconds to indicate this condition.

Locations where intersection operations shown in Tables 15 and 16 improve between 2005 existing conditions and the 2025 *Alternative 1* (No Action) can be attributed to the optimization of signal timing and roadway modifications made to reflect anticipated 2025 conditions.

## Transit & Rail

By the year 2025, it is anticipated that the Downtown Tunnel will have been reopened following the completion of construction to accommodate new track construction for light rail. Therefore, transit that was re-routed to surface streets during the closure will have returned to the tunnel. In addition, bus transit headways are expected to increase while overall transit service headways are expected to be reduced through Downtown since rail service will attract a portion of transit ridership. The number of routes and the frequency of routes traveling through Downtown and near the project site are expected to be similar to current conditions.

It is not anticipated that any changes are likely to be made to the existing Seattle Center Monorail which would result in operations being significantly different than those documented above for existing conditions.

As stated previously in the planned improvements section for the initial phase, the South Lake Union Streetcar is anticipated to be complete by 2007, and would improve transit connectivity through the study area. This is anticipated to increase transit travel within the study area compared to 2005 existing levels.

## Non-Motorized Facilities

As stated in the *Planned Improvements* portion of this section, no changes to the non-motorized facilities within the study area are anticipated by 2025. While non-motorized travel is anticipated to increase within the study area compared to 2005 existing levels, existing non-motorized facilities are anticipated to accommodate anticipated growth.

## Safety

There would be a slight increase in the potential for traffic accidents at the study intersections proportionate to the increase in traffic due to background and pipeline traffic growth that would occur by 2025. Therefore, it is possible that the proportionate increase in traffic at the intersections of Mercer St/5<sup>th</sup> Avenue, Mercer St/9<sup>th</sup> Avenue, and Denny Way/Westlake Ave. N. may impact the existing safety hazard at these HAL locations.

## Parking

Parking supply in the project vicinity and on the project site is expected to remain consistent to the existing conditions documented in the affected environment section. No changes to on-street parking supply are identified by SDOT in the site vicinity. Similarly, the *Alternative 1* (No Action) would maintain current on-site parking supply for the existing uses. An additional 1,000 parking stalls would be available in the proposed Seattle Center Parking Garage, which is anticipated to be complete prior to 2025.

## Alternatives 2 and 3 Build-Out

This section documents traffic conditions within the study area in 2025 with build-out development according to either *Alternative 2*, or *Alternative 3*. *Alternative 2* build-out includes the development of up to 1,000,000 square feet of office space spread through several buildings located in a campus setting. *Alternative 3* build-out includes the development of up to 900,000 square feet of office space spread through several buildings located in a campus setting.

## Street System

No off-site modifications to street channelization or intersection control are proposed as part of either the *Alternative 2* build-out or *Alternative 3* build-out. Development associated with both the *Alternative 2* build-out and the *Alternative 3* build-out would improve existing sidewalks on the site frontage along Mercer Street, Harrison Street and 5<sup>th</sup> Avenue N.

## Traffic Generation

Trip generation estimates for build-out were developed using the same methodology used to estimate trip generation for the initial phase. The five step process used to estimate trip generation was unchanged from that of initial phase, with the exception of the mode split assumptions. For build-out it was assumed that a TMP would be in place, with the following values:

Transit/Bike/Walk:	30%
Carpool/Vanpool:	20%
SOV:	50%

As shown in Table 17, *Alternative 2* build-out (1,000,000 sf) would generate a total of about 5,625 average weekday trips, with 1,050 occurring during the weekday AM peak hour, and 985 during the PM peak hour. For comparison purposes, the *Alternative 3* build-out (900,000 sf) would generate approximately 11 percent fewer AM and PM peak hour trips than the *Alternative 2* build-out.

**Table 17. 2025 Build-Out – Net New Trip Generation**

Time Period	Daily	AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
Alternative 2 Build-Out	5,625	975	75	1050	100	885	985
Alternative 3 Build-Out	5,060	880	65	945	90	795	885

## Distribution and Assignment

Traffic associated with both the *Alternative 2* build-out and the *Alternative 3* build-out is expected to distribute to surrounding local and regional roadways based on the same percentages outlined in Table 5 for the initial phase.

The inbound and outbound distribution patterns shown in Figures 6 and 7 were used to assign *Alternative 2* build-out and *Alternative 3* build-out AM and PM peak hour traffic to the study area roadways and intersections. The resulting AM and PM peak hour assignments of project-generated traffic are illustrated in Figures 11 and 12 for the *Alternative 2* build-out and the *Alternative 3* build-out respectively.

## Traffic Volume Impacts

Peak hour with project traffic volumes for the build-out alternatives were developed by assigning the project-generated trips to the 2025 *Alternative 1* (No Action) peak hour traffic volumes at the study intersections. The resulting traffic volumes with the build-out alternatives are illustrated in Figures 13 and 14. These volumes were then compared with the *Alternative 1* (No Action) traffic volumes in order to identify the traffic volume impacts of the *Alternative 2* build-out and *Alternative 3* build-out in the year 2025. Tables 18 and 19 illustrate the percent impact of traffic generated by the *Alternative 2*

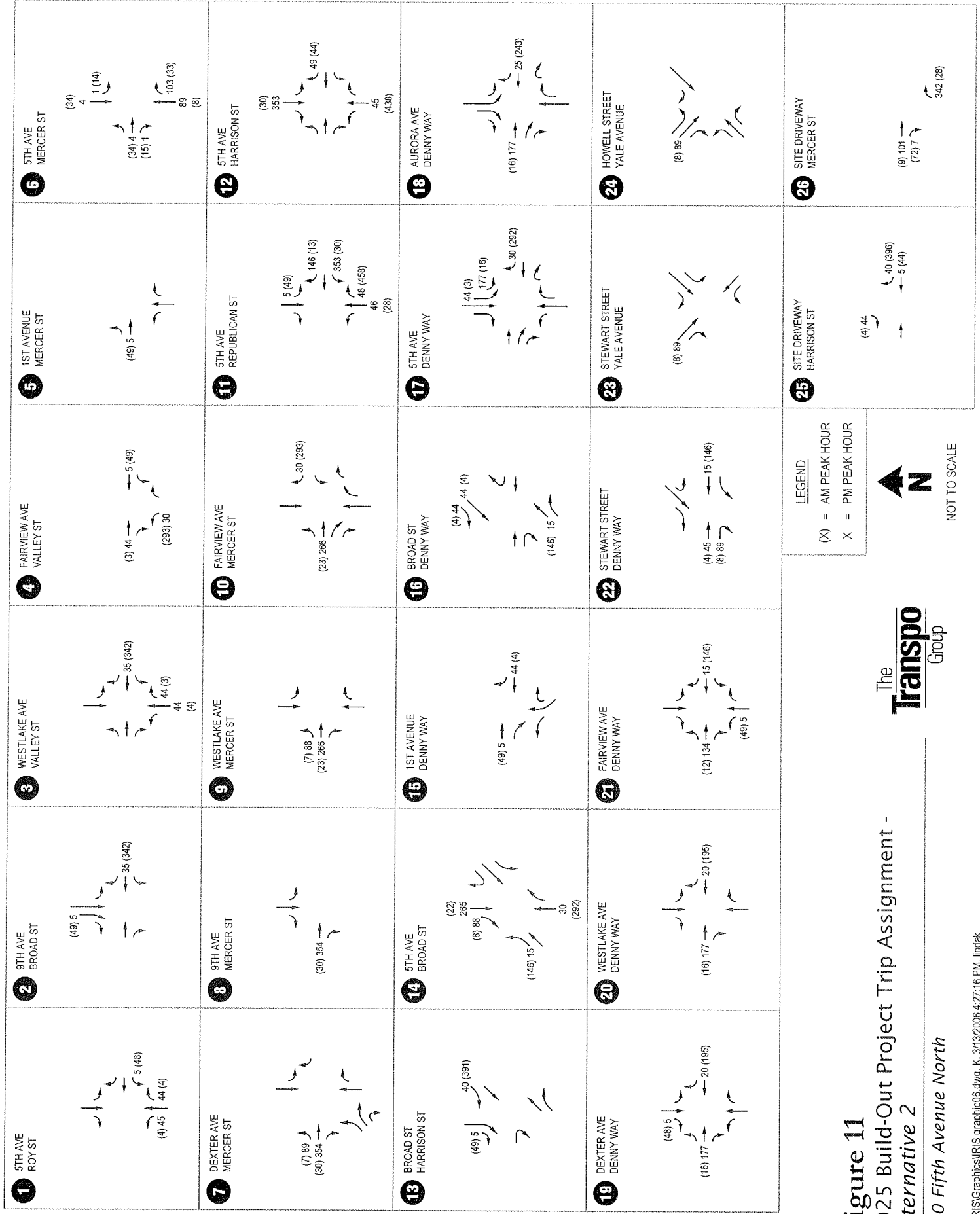
build-out and *Alternative 3* build-out at the study area intersections during weekday AM and PM peak hours.

**Table 18. 2025 Build-Out AM Peak Hour Percent Project Impact**

Intersection	Alternative 1 (No Action)	Alternative 2		Alternative 3	
		Project Traffic	% Project Impact	Project Traffic	% Project Impact
1 5 <sup>th</sup> Ave/Roy St	1,030	56	5.2%	51	4.7%
2 9 <sup>th</sup> Ave/Broad St	3,750	391	9.4%	352	8.6%
3 Westlake Ave/Valley St	4,800	349	6.8%	314	6.1%
4 Fairview Ave/Valley St	4,610	345	7.0%	311	6.3%
5 1 <sup>st</sup> Ave/Mercer St	1,695	49	2.8%	44	2.5%
6 5 <sup>th</sup> Ave/Mercer St	2,600	138	5.0%	124	4.6%
7 Dexter Ave/Mercer St	3,535	37	1.0%	32	0.9%
8 9 <sup>th</sup> Ave/Mercer St	3,545	30	0.8%	26	0.7%
9 Westlake Ave/Mercer St	4,015	30	0.7%	26	0.6%
10 Fairview Ave/Mercer St	7,880	316	3.9%	284	3.5%
11 5 <sup>th</sup> Ave/Republican	1,210	578	32.3%	520	30.1%
12 5 <sup>th</sup> Ave/Harrison St	1,270	512	28.7%	465	26.8%
13 Broad St/Harrison St*	2,455	440	15.2%	396	13.9%
14 5 <sup>th</sup> Ave/Broad St	2,345	468	16.6%	422	15.3%
15 1 <sup>st</sup> Ave/Denny Way	4,105	53	1.3%	47	1.1%
16 Broad St/Denny Way	3,835	154	3.9%	94	2.4%
17 5 <sup>th</sup> Ave/Denny Way	2,655	311	10.5%	281	9.6%
18 Aurora Ave/Denny Way	4,175	259	5.8%	234	5.3%
19 Dexter Ave/Denny Way	3,215	259	7.5%	234	6.8%
20 Westlake Ave/Denny Way	3,340	211	5.9%	190	5.4%
21 Fairview Ave/Denny Way	3,515	207	5.6%	187	5.1%
22 Stewart St/Denny Way	4,965	158	3.1%	143	2.8%
23 Stewart St/Yale Ave	3,080	8	0.3%	7	0.2%
24 Howell St/Yale Ave	1,955	8	0.4%	7	0.4%

Beyond the immediate study area, traffic generated by the *Alternative 2* build-out would generally account for less than ten percent of the total entering traffic during the AM and PM peak hours. The portion of the study area bounded by 5<sup>th</sup> Ave. N., Denny Way, and Mercer St. would experience the greatest traffic impact, ranging from approximately 5 to 33 percent. This is due to their close proximity to the project site. Traffic volume impacts associated with the *Alternative 3* build-out are similar to those of the *Alternative 2* build-out. They range from approximately 5 to 30 percent at the study intersections adjacent to the project site.

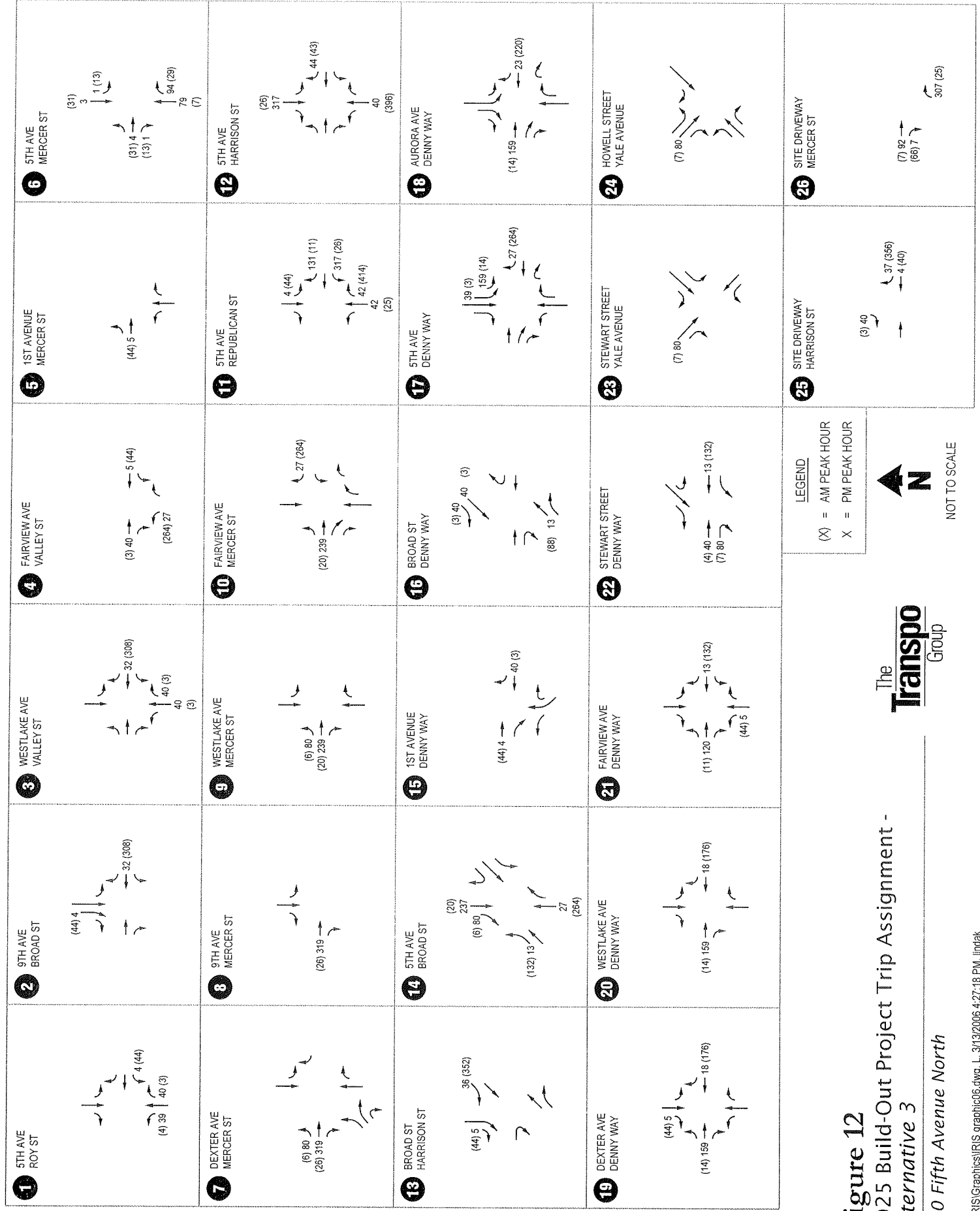
During the weekday AM peak hour, the project impact at the most congested intersections range from 3.1 percent (158 trips) at the Stewart St./Denny Way intersection, to 5.8 percent (259 trips) at the intersection of Denny Way/Aurora Ave for the *Alternative 2* build-out. For the *Alternative 3* build-out, the project impacts range from 2.8 percent (143 trips) at the Stewart St./Denny Way intersection, to 5.3 percent (234 trips) at the intersection of Denny Way/Aurora Ave, slightly lower than for the *Alternative 2* build-out. Peak hour traffic volumes typically vary on a daily basis and have been documented to fluctuate as high as 5 percent, yet the fluctuation is usually unnoticeable from a driver's perspective.



**Figure 11**  
2025 Build-Out Project Trip Assignment -  
Alternative 2  
500 Fifth Avenue North

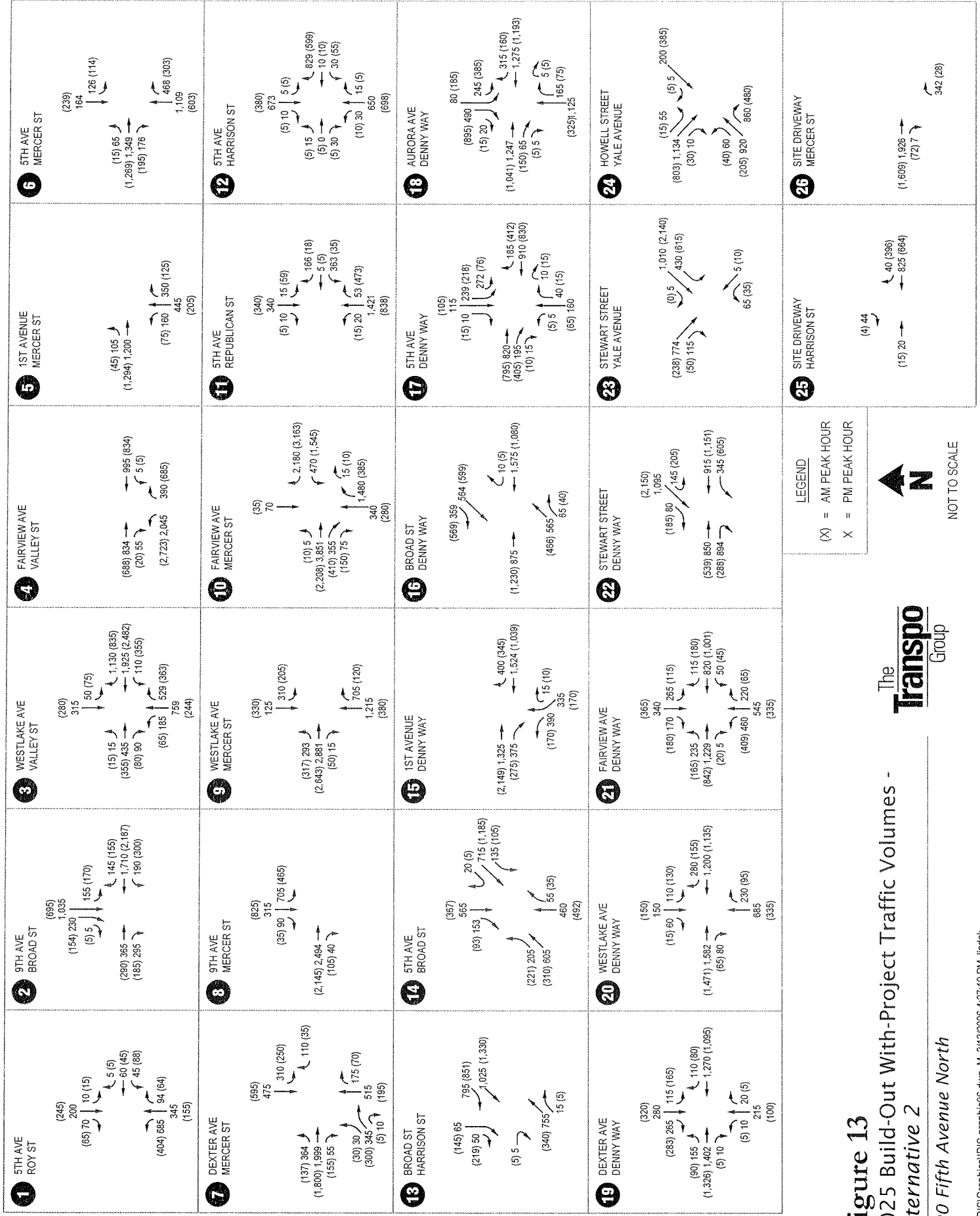
The  
**Transpo**  
Group

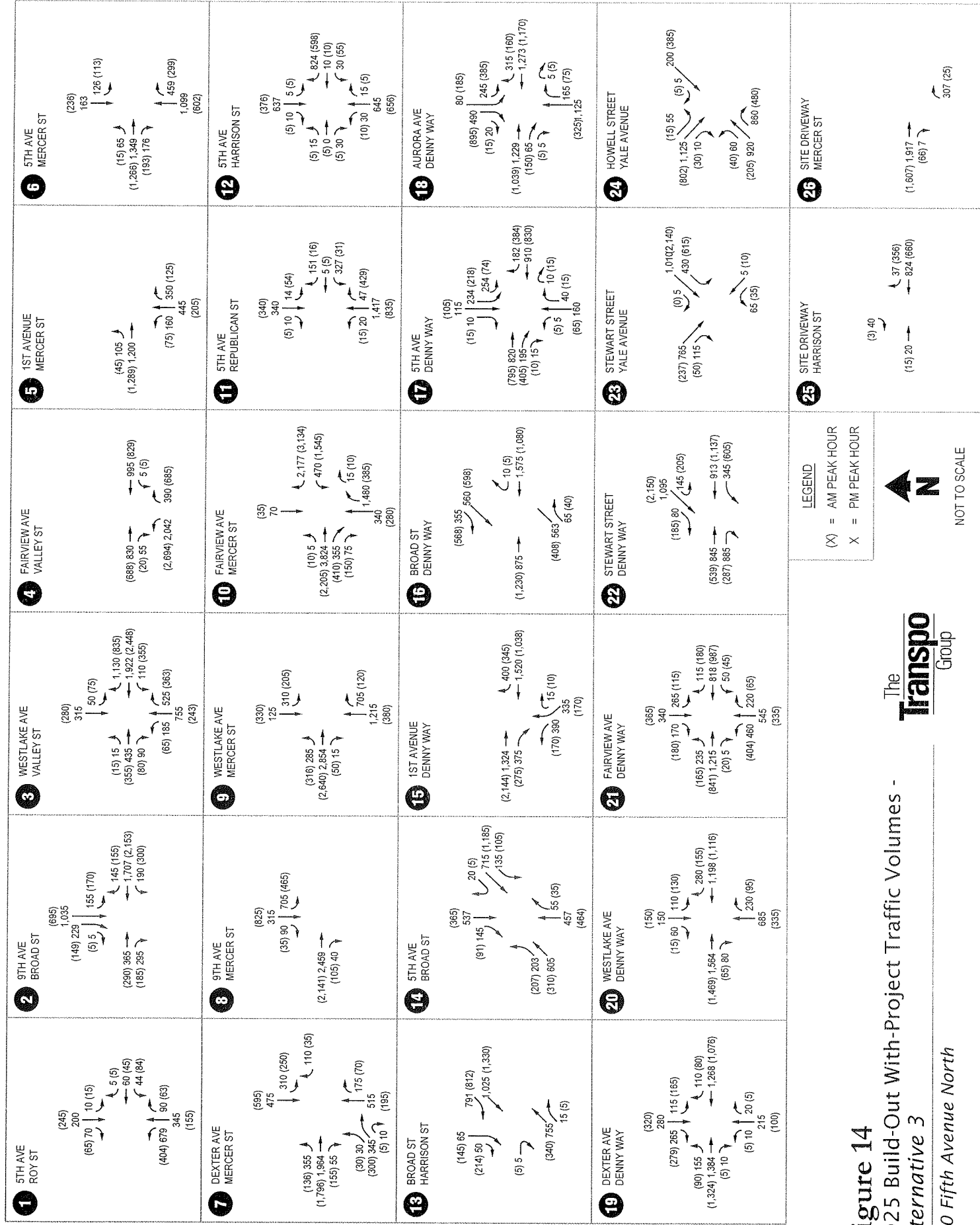




**Figure 12**  
2025 Build-Out Project Trip Assignment -  
Alternative 3  
500 Fifth Avenue North

The  
**Transpo**  
Group





During the weekday PM peak hour, the project impacts range from 2.7 percent (89 trips) at the Howell St./Yale Ave. intersection, to 6.4 percent (354 trips) at the intersection of Westlake Ave./Mercer St, for the *Alternative 2* build-out. For the *Alternative 3* build-out, the project impact at the most congested intersections range from 2.5 percent (80 trips) at the Howell St./Yale Ave. intersection, to 5.8 percent (319 trips) at the intersection of Westlake Ave./Mercer St, slightly lower than for the *Alternative 2* build-out. Peak hour traffic volumes typically vary on a daily basis and have been documented to fluctuate as high as 5 percent, yet the fluctuation is usually unnoticeable from a driver's perspective.

The percentages identified in Tables 18 and 19 show that the impacts of the build-out alternatives would fall within the range of fluctuation that occurs as a result of background traffic at the majority of study intersections. For those intersections closest to the project sites that have a 5 to 35 percent impact, intersection operations were evaluated to determine whether additional measures would be needed to mitigate impacts of the build-out alternatives, as described in the following sections.

**Table 19. 2025 Build-Out PM Peak Hour Percent Project Impact**

Intersection	Alternative 1 (No Action)	Alternative 2		Alternative 3	
		Project Traffic	% Project Impact	Project Traffic	% Project Impact
1 5 <sup>th</sup> Ave/Roy St	1,420	94	6.2%	83	5.5%
2 9 <sup>th</sup> Ave/Broad St	4,090	40	1.0%	36	0.9%
3 Westlake Ave/Valley St	5,420	123	2.2%	112	2.0%
4 Fairview Ave/Valley St	4,245	79	1.8%	72	1.7%
5 1 <sup>st</sup> Ave/Mercer St	2,255	5	0.2%	5	0.2%
6 5 <sup>th</sup> Ave/Mercer St	3,255	202	5.8%	182	5.3%
7 Dexter Ave/Mercer St	3,945	443	10.1%	399	9.2%
8 9 <sup>th</sup> Ave/Mercer St	3,290	354	9.7%	319	8.8%
9 Westlake Ave/Mercer St	5,190	354	6.4%	319	5.8%
10 Fairview Ave/Mercer St	8,545	296	3.3%	266	3.0%
11 5 <sup>th</sup> Ave/Republican	1,795	598	25.0%	536	23.0%
12 5 <sup>th</sup> Ave/Harrison St	1,850	447	19.5%	401	17.8%
13 Broad St/Harrison St*	2,730	45	1.6%	41	1.5%
14 5 <sup>th</sup> Ave/Broad St	2,515	398	13.7%	357	12.4%
15 1 <sup>st</sup> Ave/Denny Way	4,315	49	1.1%	44	1.0%
16 Broad St/Denny Way	3,910	103	2.6%	93	2.3%
17 5 <sup>th</sup> Ave/Denny Way	2,725	251	8.4%	225	7.6%
18 Aurora Ave/Denny Way	4,835	202	4.0%	182	3.6%
19 Dexter Ave/Denny Way	3,650	202	5.2%	182	4.7%
20 Westlake Ave/Denny Way	4,180	197	4.5%	177	4.1%
21 Fairview Ave/Denny Way	4,300	154	3.5%	138	3.1%
22 Stewart St/Denny Way	4,175	149	3.4%	133	3.1%
23 Stewart St/Yale Ave	2,315	89	3.7%	80	3.3%
24 Howell St/Yale Ave	3,155	89	2.7%	80	2.5%

## Traffic Operations Impacts

Traffic operations impacts include the consideration of changes in operations of study area intersections, as well as at the proposed site access at the points where it interfaces with abutting streets. This section also evaluates area-wide concurrency based on the City's screenline analysis.

### ***Intersection Level of Service***

Tables 20 and 21 provide a summary of the build-out project alternatives' weekday AM and PM peak hour levels of service, respectively, for each intersection. For purposes of comparison, *Alternative 1* (No Action) levels of service are also provided.

Seven of the signalized study intersections will continue to operate at LOS F with or without the *Alternative 2* build-out or *Alternative 3* build-out. Project impacts to these locations are summarized below in terms of traffic volume impacts. When an intersection reaches LOS F, vehicle delay calculations are sensitive and may not provide a reliable measure of project impacts.

**#3. Westlake Ave/Valley St.** This intersection would continue to operate at LOS F during the PM peak hour. *Alternative 2* build-out project traffic accounts for 2.2 percent of the PM peak hour entering volumes at this intersection, while the *Alternative 3* build-out would account for 2.0 percent. The South Lake Union Transportation Study has identified solutions to address both the existing and future operational deficiencies at this intersection.

**#7. Dexter Ave/Mercer St.** This intersection would continue to operate at LOS F during the PM peak hour. *Alternative 2* build-out project traffic accounts for 10.1 percent of the PM peak hour entering volumes at this intersection, while the *Alternative 3* build-out would account for 9.2 percent. The South Lake Union Transportation Study has identified solutions to address both the existing and future operational deficiencies at this intersection.

**#9. Mercer St./Westlake Ave. N.** This intersection would continue to operate at LOS F during the PM peak hour. *Alternative 2* build-out project traffic accounts for 6.4 percent of the PM peak hour entering volumes at this intersection, while the *Alternative 3* build-out would account for 5.8 percent. The South Lake Union Transportation Study has identified solutions to address both the existing and future operational deficiencies at this intersection.

**#10. Mercer St./Fairview Ave. N.** This intersection would continue to operate at LOS F during both the AM and PM peak hours. With either *Alternative 2* build-out or *Alternative 3* build-out, project traffic accounts for less than 4.0 percent of the peak hour entering traffic volumes at this location. The South Lake Union Transportation Study has identified solutions to address both the existing and future operational deficiencies at this intersection.

**#18. Denny Way/Aurora Ave.** This intersection would continue to operate at LOS F during both the AM and PM peak hour. During the AM peak hour project accounts for less than 6.0 percent of entering volumes at this intersection for both *Alternatives 2 and 3*. During the PM peak hour project accounts for less than 4.0 percent of entering volumes at this intersection for both *Alternatives 2 and 3*.

The Washington State Department of Transportation (WSDOT) and City of Seattle, as part of the larger Alaskan Way Viaduct replacement solution, are currently evaluating changes to SR 99 through the South Lake Union Neighborhood. The current proposal would lower SR 99 between Roy Street and Denny Way, and would reconnect several streets across SR 99, including Republican Street, Harrison Street, and Thomas Street.

In addition, the connections between SR 99 and the surface street network would be modified to provide additional access points at Roy Street and Republican Street. The Alaskan Way Viaduct project is not anticipated to be complete until beyond 2010, so was not included in the evaluation of project impacts for the *Alternative 2* build-out or *Alternative 3* build-out. However, when complete, the Alaskan Way Viaduct project would relieve congestion at the Aurora Ave/Denny Way intersection, through the provision of the additional access ramps.

**#22. Stewart St./Denny Way.** This intersection would continue to operate at LOS F during both the AM and PM peak hours. Project traffic accounts for less than 4.0 percent of entering volumes at this intersection during both peak hours and for both *Alternatives 2 and 3*. Improvement options are limited due to capacity restraints and its close proximity to the I-5 entrance and exit.

**#24. Howell St./Yale Ave.** This intersection would continue to operate at LOS F during both the AM and PM peak hours. With either *Alternative*, project traffic accounts for less than 3.0 percent of the PM peak hour entering volumes at this intersection, and less than 1.0 percent during the AM peak hour. Improvement options are limited due to capacity restraints and high traffic volumes entering I-5.

In addition to the intersections which are anticipated to operate at LOS F with *Alternative 2* build-out or *Alternative 3* build-out, one of the signalized study intersections will continue to operate at LOS E with or without either *Alternative*.

**#14. 5<sup>th</sup> Ave./Broad St.** This intersection would continue to operate at LOS E during the AM peak hour. Project traffic accounts for between 16.6 percent and 15.3 percent of the AM peak hour entering volumes at this intersection, for *Alternative 2* and *Alternative 3* respectively.

During the AM peak hour, the addition of traffic generated by the *Alternative 2* build-out would cause the level of service at the following intersection to degrade:

- #2. 9<sup>th</sup> Ave/Broad St (LOS D to LOS F)
- #3. Westlake Ave/Valley St (LOS D to LOS F)
- #4. Fairview Ave/Valley St (LOS D to LOS E)
- #13. Broad St/Harrison St (LOS C to LOS D)
- #19. Dexter Ave/Denny Way (LOS B to LOS C)
- #21. Fairview Ave/Denny Way (LOS D to LOS E)

**#2. 9<sup>th</sup> Ave/Broad St.** This intersection would degrade operations from LOS D to LOS F during the AM peak hour with the *Alternative 2* build-out. Average intersection delay at this intersection would increase by approximately 40 seconds as a result of the addition of approximately 391 project trips representing 9.4 percent of total traffic. The South Lake Union Transportation Study has identified solutions to address both the existing and future operational deficiencies at this intersection.

**#3. Westlake Ave/Valley St.** This intersection would degrade operations from LOS D to LOS F during the AM peak hour with the *Alternative 2* build-out. Average intersection delay at this intersection would increase by approximately 46 seconds as a result of the addition of approximately 349 project trips representing 6.8 percent of total traffic.

**#4. Fairview Ave/Valley St.** This intersection would degrade operations from LOS D to LOS E during the AM peak hour with the *Alternative 2* build-out. Average intersection delay at this intersection would increase by approximately 25 seconds as a result of the addition of approximately 345 project trips representing 7.0 percent of total traffic.

**#21. Fairview Ave./Denny Way.** This intersection would degrade operations from LOS D to LOS E during the AM peak hour with the *Alternative 2* build-out. Average intersection delay at this intersection would increase by approximately 24 seconds as a result of the addition of approximately 207 project trips representing 5.6 percent of total traffic.

The addition of project traffic generated by the *Alternative 3* build-out would result in the same changes in intersection operations as the *Alternative 2* build-out during the AM peak hour, with two exceptions:

- #2. 9<sup>th</sup> Ave./Broad St. (LOS D to LOS E)
- #3. Westlake Ave./Valley St. (LOS D to LOS E)

At the remaining study intersections, average intersection delays with the *Alternative 3* build-out would be up to approximately 5 seconds shorter than with the *Alternative 2* build-out.

The remaining study intersections would operate at the same level of service as the *Alternative 1* (No Action) build-out during the AM peak hour.

During the PM peak hour, the addition of project traffic associated with the *Alternative 2* build-out would cause the LOS at the following intersections to degrade:

- #1. 5<sup>th</sup> Ave./Roy St. (LOS C to LOS D)
- #2. 9<sup>th</sup> Ave./Broad St. (LOS C to LOS D)
- #11. 5<sup>th</sup> Ave./Republican St. (LOS A to LOS B)
- #15. 1<sup>st</sup> Ave./Denny Way (LOS B to LOS C)
- #19. Dexter Ave./Denny Way (LOS C to LOS D)
- #20. Westlake Ave./Denny Way (LOS C to LOS D)
- #21. Fairview Ave./Denny Way (LOS E to LOS F)

**#21. Fairview Ave./Denny Way.** This intersection would degrade operations from LOS E to LOS F during the PM peak hour with the *Alternative 2* build-out. Average intersection delay at this intersection would increase by approximately 12 seconds as a result of the addition of approximately 154 project trips representing 3.5 percent of total traffic.

The addition of project traffic generated by the *Alternative 3* build-out would result in the same changes in intersection operations as the *Alternative 2* build-out during the PM peak hour, with two exceptions:

- #1. 5<sup>th</sup> Ave./Roy St. (LOS C to LOS C)
- #15. 1<sup>st</sup> Ave./Denny Way (LOS B to LOS B)

At the remaining study intersections, average intersection delays with the *Alternative 3* build-out would be up to approximately 8 seconds shorter than with the *Alternative 2* build-out.

The remaining study intersections would operate at the same level of service as *Alternative 1* (No Action) build-out during the PM peak hour.

**Table 20. 2025 Build-Out AM Peak Hour LOS Summary**

#	Intersection	Alternative 1 (No Action)			Alternative 2			Alternative 3		
		LOS <sup>1</sup>	Delay <sup>2</sup>	V/C or WM <sup>3</sup>	LOS	Delay	V/C or WM	LOS	Delay	V/C or WM
1	5 <sup>th</sup> Ave/Roy St	C	28.0	0.55	C	28.9	0.59	C	28.8	0.59
2	9 <sup>th</sup> Ave/Broad St	D	42.3	1.02	F	82.1	1.15	E	77.9	1.14
3	Westlake Ave/Valley St	D	35.2	1.11	F	81.0	1.15	E	70.9	1.17
4	Fairview Ave/Valley St	D	39.9	0.95	E	65.0	1.03	E	62.1	1.02
5	1 <sup>st</sup> Ave/Mercer St	B	15.1	0.56	B	15.6	0.57	B	15.5	0.57
6	5 <sup>th</sup> Ave/Mercer St	D	46.0	0.49	D	38.9	0.51	D	39.8	0.51
7	Dexter Ave/Mercer St	D	50.1	0.90	D	51.8	0.91	D	51.7	0.90
8	9 <sup>th</sup> Ave/Mercer St	D	39.2	0.84	D	39.0	0.84	D	39.1	0.84
9	Westlake Ave/Mercer St	C	26.8	0.90	C	26.7	0.90	C	27.3	0.90
10	Fairview Ave/Mercer St	F	>120.0	1.40	F	>120.0	1.52	F	>120.0	1.51
11	5 <sup>th</sup> Ave/Republican	A	9.9	0.20	A	7.1	0.34	A	6.9	0.33
12	5 <sup>th</sup> Ave/Harrison St	C	34.1	0.37	C	30.5	0.55	C	30.7	0.54
13	Broad St/Harrison St*	C	20.9	EB	D	27.5	EB	D	26.7	EB
14	5 <sup>th</sup> Ave/Broad St	E	57.6	0.58	E	55.9	0.72	E	56.0	0.70
15	1 <sup>st</sup> Ave/Denny Way	C	23.2	0.88	C	26.6	0.90	C	26.2	0.89
16	Broad St/Denny Way	C	25.3	0.85	C	26.1	0.85	C	25.9	0.85
17	5 <sup>th</sup> Ave/Denny Way	B	13.9	0.66	B	15.3	0.69	B	15.1	0.67
18	Aurora Ave/Denny Way	F	80.6	1.02	F	116.2	1.09	F	112.3	1.08
19	Dexter Ave/Denny Way	B	18.1	0.81	C	20.8	0.86	C	20.5	0.86
20	Westlake Ave/Denny Way	B	18.8	0.80	B	19.1	0.81	B	19.1	0.81
21	Fairview Ave/Denny Way	D	51.1	0.91	E	75.0	0.99	E	72.5	0.98
22	Stewart St/Denny Way	F	>120.0	1.26	F	>120.0	1.27	F	>120.0	1.26
23	Stewart St/Yale Ave	A	6.1	- <sup>5</sup>	A	6.3	- <sup>5</sup>	A	6.3	- <sup>5</sup>
24	Howell St/Yale Ave	F	94.6	1.18	F	97.7	1.19	F	97.4	1.18

1. Level of service, based on 2000 HCM methodology.

2. Average delay per vehicle, in seconds.

3. V/C = Volume-to-capacity ratio for signalized intersections, WM= worst movement/approach for unsignalized intersections.

4. Based on the v/c ratio of greater than 1.20, vehicle delay at this intersection may be greater than reported in the table.

5. Intersection runs on controller at Stewart/Denny; resulting v/c ratio not applicable to this intersection.

\* Unsignalized intersection

As Tables 20 and 21 indicate, the addition of project traffic increases delay at the majority of study intersections, which is typical when intersection volumes increase. However at six study intersections (#6, #9, and #11 during the AM peak hour, and #12 and #14 during both the AM and PM peak hours) the v/c ratio increases while the delay decreases compared to the *Alternative 1* (No Action) build-out. This is the result of project trips being added to the non-critical movements at these intersections, which in turn results in reduced average vehicle delays for the intersection overall.



**Table 21. 2025 Build-Out PM Peak Hour LOS Summary**

#	Intersection	Alternative 1 (No Action)			Alternative 2			Alternative 3		
		LOS <sup>1</sup>	Delay <sup>2</sup>	V/C or WM <sup>3</sup>	LOS	Delay	V/C or WM	LOS	Delay	V/C or WM
1	5 <sup>th</sup> Ave/Roy St	C	25.4	0.72	D	35.7	0.76	C	33.1	0.76
2	9 <sup>th</sup> Ave/Broad St	C	34.8	0.99	D	38.3	1.01	D	37.9	1.01
3	Westlake Ave/Valley St	F	85.6	1.28	F	98.4	1.31	F	97.3	1.31
4	Fairview Ave/Valley St	C	31.1	0.85	C	31.9	0.87	C	31.8	0.87
5	1 <sup>st</sup> Ave/Mercer St	C	20.9	0.69	C	21.0	0.70	C	21.0	0.70
6	5 <sup>th</sup> Ave/Mercer St	C	28.6	0.69	C	33.6	0.72	C	34.5	0.72
7	Dexter Ave/Mercer St	F	83.8	1.18	F	87.8	1.27	F	86.3	1.23
8	9 <sup>th</sup> Ave/Mercer St	C	31.0	0.74	C	31.2	0.80	C	31.1	0.80
9	Westlake Ave/Mercer St	F	>120.0	1.25	F	>120.0	1.32	F	>120.0	1.31
10	Fairview Ave/Mercer St	F	>120.0	1.50	F	>120.0	1.56	F	>120.0	1.55
11	5 <sup>th</sup> Ave/Republican	A	8.3	0.34	B	13.8	0.61	B	12.0	0.59
12	5 <sup>th</sup> Ave/Harrison St	C	31.7	0.63	C	34.1	0.69	C	29.5	0.57
13	Broad St/Harrison St*	C	19.6	EB	C	20.0	EB	C	20.0	EB
14	5 <sup>th</sup> Ave/Broad St	C	22.1	0.60	C	20.0	0.62	C	20.5	0.62
15	1 <sup>st</sup> Ave/Denny Way	B	19.5	0.85	C	20.0	0.86	B	19.9	0.86
16	Broad St/Denny Way	C	22.5	0.79	C	23.5	0.83	C	23.4	0.83
17	5 <sup>th</sup> Ave/Denny Way	B	17.5	0.67	B	19.1	0.71	B	18.9	0.71
18	Aurora Ave/Denny Way	F	>120.0	1.26	F	>120.0	1.27	F	>120.0	1.27
19	Dexter Ave/Denny Way	C	26.3	0.93	D	50.1	1.02	D	47.5	1.01
20	Westlake Ave/Denny Way	C	36.1	1.02	D	45.0	1.13	D	46.2	1.10
21	Fairview Ave/Denny Way	E	77.4	1.01	F	89.2	1.05	F	87.7	1.04
22	Stewart St/Denny Way	F	87.2	1.12	F	106.5	1.17	F	104.3	1.16
23	Stewart St/Yale Ave	C	21.6	- <sup>5</sup>	C	34.5	- <sup>5</sup>	C	33.0	- <sup>5</sup>
24	Howell St/Yale Ave	F	>120.0	1.51	F	>120.0	1.59	F	>120.0	1.59

1. Level of service, based on 2000 HCM methodology.

2. Average delay per vehicle, in seconds.

3. V/C = Volume-to-capacity ratio for signalized intersections, WM= worst movement/approach for unsignalized intersections.

4. Based on the v/c ratio of greater than 1.20, vehicle delay at this intersection may be greater than reported in the table.

5. Intersection runs on controller at Stewart/Denny; resulting v/c ratio not applicable to this intersection.

\* Unsignalized intersection

## Site Access

Three points of ingress and egress would be provided for the *Alternative 2* build-out and *Alternative 3* build-out. As described previously, access to the Seattle Center Parking Garage would be provided via the signalized intersection of 5<sup>th</sup> Ave./Republican St., with a secondary access provided from Harrison St., via a right-in/right-out only driveway. Access to the parking structure beneath the *Alternative 2* initial phase is proposed to also be provided from the signalized intersection of 5<sup>th</sup> Ave./Republican St. via a subterranean connection through the Seattle Center Garage. A secondary, right-in/right-out only access to the parking structure beneath the *Alternative 2* initial phase is proposed to be provided from Mercer Street, in the vicinity of Taylor Avenue. A LOS analysis was conducted for each site access intersections for the AM and PM peak hours.

Table 22 summarizes the weekday AM and PM peak hour levels of service for the site access intersections that would serve the build-out Alternatives.

**Table 22. 2025 Build-Out Driveway LOS Summary**

Intersection	Alternative 2			Alternative 3		
	LOS <sup>1</sup>	Delay <sup>2</sup>	V/C or WM <sup>3</sup>	LOS	Delay	V/C or WM
<b>AM Peak Hour</b>						
5 <sup>th</sup> Avenue/Republican St	A	7.1	0.34	A	6.9	0.33
South Driveway/Harrison St	B	11.6	SB	B	11.3	SB
North Driveway/Mercer St	B	12.3	NB	B	12.2	NB
<b>PM Peak Hour</b>						
5 <sup>th</sup> Avenue/Republican St	B	13.8	0.61	B	12.0	0.59
South Driveway/Harrison St	B	10.7	SB	B	10.7	SB
North Driveway/Mercer St	C	23.7	NB	C	21.8	NB

1. Level of service, based on 2000 HCM methodology.  
2. Average delay per vehicle, in seconds.  
3. V/C = Volume-to-capacity ratio for signalized intersections, WM= worst movement/approach for unsignalized intersections.

As shown in Table 22, the site access intersections are estimated to operate at LOS C or better during both the AM and PM peak hours. The results indicate the site access intersections would provide adequate capacity for the proposed garage access locations.

In addition to the analysis of the site access intersections, vehicle queuing and individual movement levels of service were examined at the intersections directly adjacent to the site access intersections to determine how they interact with each other. With the *Alternative 2* build-out, during the AM peak hour the driveway approach at the 5<sup>th</sup> Ave/Republican St intersection would operate at LOS D, but with vehicle queues of only approximately three vehicles. The Harrison Street driveway is anticipated to operate at LOS B during the AM peak hour, as shown in Table 22, with minimal vehicle queues on the driveway approach. However, it is anticipated that the westbound queue from the 5<sup>th</sup> Ave/Harrison St signal would extend beyond the driveway intersection, blocking the Harrison St driveway at times during the AM peak hour. No blocking issues are anticipated at the 5<sup>th</sup> Ave/Republican St intersection during the AM peak hour. Conditions with the *Alternative 3* build-out would be slightly better due to the lower trip generation than for the *Alternative 2* build-out.

During the PM peak hour, with the *Alternative 2* build-out, the driveway approach to the 5<sup>th</sup> Ave/Republican St intersection is anticipated to operate at LOS C, however due to higher PM peak hour outbound traffic volumes, on-site vehicle queues are anticipated to extend for approximately 250 feet. As shown in Table 22, the Harrison Street driveway approach is anticipated to operate at LOS B, with minimal vehicle queuing. The westbound queue from the 5<sup>th</sup> Ave/Harrison St intersection is anticipated to block the Harrison Street driveway during the PM peak hour, however, this queue is anticipated to be shorter during the PM peak hour than in the AM so would block the driveway less frequently and for shorter time periods. It is also anticipated that the northbound through/right-turn queue at the 5<sup>th</sup> Ave/Mercer Street intersection could, for short periods, extend beyond the 5<sup>th</sup> Ave/Republican St intersection during the PM peak hour. Conditions with the *Alternative 3* build-out would be slightly better due to the lower trip generation than for the *Alternative 2* build-out; however, the same blocking issues documented above would continue to be experienced.

## Transportation Concurrency

The four screenlines that were analyzed for concurrency review (see prior discussion for the *Alternative 2* initial phase) include the Ship Canal Bridges and South Lake Union, as shown in Table 23.

The transportation concurrency analysis indicates that with traffic generated by either of the build-out alternatives, the screenlines would have v/c ratios that are less than the City level of service threshold and thus, the alternatives would meet concurrency requirements.

**Table 23. 2025 Build-Out Concurrency Analysis**

SL <sup>1</sup> Number	Location	Direction <sup>2</sup>	Capacity	1998 Volume	V/C Standard	Alternative 2		Alternative 3	
						Project Traffic	V/C	Project Traffic	V/C
2	Magnolia	EB	4,480	2,130	1.00	10	0.48	9	0.48
		WB	4,480	2,820	1.00	89	0.65	79	0.65
5.12	Fremont Bridge	NB	2,000	2,070	1.20	44	1.06	40	1.06
		SB	2,000	1,270	1.20	5	0.64	4	0.64
5.13	Aurora Avenue	NB	4,950	4,908	1.20	89	1.01	80	1.01
		SB	4,950	3,195	1.20	10	0.65	9	0.65
5.16	University and Montlake Bridges	NB	4,300	3,820	1.20	266	0.95	239	0.94
		SB	4,300	3,630	1.20	30	0.85	27	0.85
8	South of Lake Union	EB	6,500	4,920	1.20	487	0.83	438	0.82
		WB	4,100	3,300	1.20	55	0.82	50	0.82

1. SL = Screen Line

2. Direction: NB = Northbound, SB = Southbound, EB = Eastbound, WB = Westbound

## Transit Impacts

With site specific programs like a Transportation Management Program (TMP) or Commute Trip Reduction (CTR) in place, the transit mode split is expected to represent up to 30 percent of total person trips generated by the build-out alternatives. Under the *Alternative 2* build-out, approximately 2,870 daily transit trips would be generated by the development. Of those, approximately 535 transit trips would occur during the AM peak hour and approximately 505 transit trips during the PM peak hour.

Since the *Alternative 3* build-out would generate slightly fewer trips than the *Alternative 2* build-out, the transit trips would also be slightly fewer -- approximately 2,580 daily, 485 AM peak and 455 PM peak transit trips.

Existing transit routes serving the site vicinity provide regular service. The nearest stops are located north and south of the site on 5<sup>th</sup> Ave. N., and along Aurora Ave. N. These stops serve Routes 3N, 4N, 5, 16, 26, 28, 82, and 358, providing service to Downtown Seattle, Rainier Beach, University District, Northgate, Lake City, Shoreline, White Center and other local and regional locations. From these stops, transit service can be taken to destinations throughout the region. South of the site on Broad St., Routes 3S, 4S, and 74 are served by a westbound stop near 5<sup>th</sup> Ave. N. In addition, it is possible that some Foundation employees would likely use the existing Seattle Center Monorail to travel between the project site and downtown Seattle. However, no noticeable numbers of Foundation employees were assumed to use the proposed South Lake Union Streetcar, due to the distance between the two, and location of Aurora Avenue. All of the routes provide service during the morning and afternoon commuter peaks. Existing transit service is expected to accommodate the additional demand generated by the *Alternative 2* build-out or *Alternative 3* build-out with a TMP program and, therefore, no significant adverse impacts to transit operations are expected to occur.

## Non-Motorized Travel Impacts

As part of the build-out alternatives the existing sidewalks on each project site frontage would be improved. The build-out alternatives would also provide secure bicycle storage on the project site.

Existing non-motorized facilities within the study area are expected to accommodate the portion of the *Alternative 2* build-out trip generation that is expected to walk or bike to the project site. The *Alternative 2* build-out would not degrade any existing facilities; the redevelopment would enhance those facilities directly adjacent to each site. Thus, no significant adverse impacts to non-motorized facilities or operations are expected to occur as a result of the *Alternative 2* build-out of development.

The *Alternative 3* build-out is anticipated to generate fewer non-motorized trips than the *Alternative 2* build-out, due to the reduced development size. Therefore, no significant adverse impacts to non-motorized facilities or operations are expected to occur as a result of the *Alternative 3* build-out of development.

## Safety Impacts

Adding *Alternative 2* build-out traffic volumes to study intersections and roadways would likely cause a proportionate increase in the probability of traffic accidents. Therefore, it is possible that the proportionate increase in traffic at the intersections of Mercer St/5<sup>th</sup> Avenue, Mercer St/9<sup>th</sup> Avenue, and Denny Way/Westlake Ave. N. may impact the existing safety hazard at these HAL locations.

The *Alternative 3* build-out traffic volumes would likely result in a slight reduction in the probability of traffic accidents than the *Alternative 2* build-out. This can be attributed to the lower trip generation for the *Alternative 3* build-out than for the *Alternative 2* build-out.

## Parking Impacts

### Code Requirements

The City of Seattle parking code requires a minimum of 1.0 stall per 1,000 gsf office space. The minimum parking supply required by the *Alternative 2* build-out to meet City of Seattle parking code requirements would be 1,000 stalls. The proposed on-site parking stalls and the covenanted stalls in the Seattle Center Parking Garage count towards meeting the code requirement. The parking supply, 1,226 stalls (980 on-site+246<sup>6</sup> covenanted spaces) for the *Alternative 2* build-out would meet code requirements.

City of Seattle parking code requirements for the *Alternative 3* build-out require a minimum of 900 parking stalls. The proposed on-site parking stalls and the agreed leased stalls in the Seattle Center Parking Garage count towards meeting the code requirement. This parking supply, 1,226 stalls (980 on-site+246 covenanted spaces), would be sufficient to meet City code requirements for this *Alternative*.

### Parking Supply

On-site parking is proposed both below the *Alternative 2* build-out, and in the proposed Seattle Center Parking Garage. A total of approximately 980 parking stalls are proposed as part of the *Alternative 2* build-out. In addition to the approximately 980 spaces being provided on-site, the Seattle

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<sup>6</sup> The total number of spaces to be covenanted is 300. Of the 300, 246 spaces would be allocated to the campus and 54 spaces would be allocated to the visitor learning center and retail in the new Seattle Center garage.

Center has agreed to covenant 246 stalls in the Seattle Center Parking Garage for exclusive daily use (up to 6:00 pm Monday through Friday) by the Foundation. For the *Alternative 2* build-out, there would be a total parking supply of 1,226 parking stalls.

Parking supply proposed for the *Alternatives 3* build-out would be the same as for the *Alternative 2* build-out, with a total parking supply of 1,226 stalls.

### ***Parking Demand***

Parking demand for the build-out alternatives was calculated using the same approach as for the initial phase, with the exception that mode-split assumptions are consistent with those identified for the build-out alternatives, assuming a TMP in place. Calculation worksheets for the parking demand analysis are provided in Attachment D to this technical report.

Peak parking demand for the *Alternative 2* build-out would total 1,742 parking stalls. Assuming a total of 1,226 parking spaces for the *Alternative 2* build-out has an effective supply of 95 percent, or 1,165 spaces, the peak demand would exceed supply by approximately 577 parking stalls<sup>7</sup>. This excess parking demand would need to be accommodated through the use of available off-site off-street parking in the vicinity of the project site.

Peak parking demand for the *Alternative 3* build-out would total 1,568 parking stalls. Assuming a total of 1,226 parking spaces for the *Alternative 3* build-out has an effective supply of 95 percent, or 1,165 spaces, the peak parking demand would exceed supply by approximately 403 parking stalls.

**Table 24. Build-Out Parking Summary**

Alternative/Phase	Proposed Parking Supply	Parking Code Regulations	Practical Parking Supply <sup>1</sup>	Parking Demand	Parking Surplus/Deficit <sup>2</sup>
Aggressive TMP Assumptions					
Alternative 2 Build-Out	1,226	1,000	1,165	1,742	-577
Alternative 3 Build-Out	1,226	900	1,165	1,568	-403

1. Assumes a 5% reduction to account for the practical capacity of the parking supply.

2. A parking deficit is indicated by a negative number, a parking surplus is shown by a positive number.

## **Alternative 4 Build-Out**

The development proposed to occur under the *Alternative 4* build-out would include the same characteristics as the development identified for the *Alternative 3* build-out, with the development of up to 900,000 square feet of office space spread through several buildings located in a campus setting. The difference between the *Alternative 3* build-out and the *Alternative 4* build-out is that the improvements planned for Mercer Street and Aurora Avenue have been assumed in the design of the campus.

The Mercer Street improvements call for the conversion of Mercer St. from one-way to two-way operations, with the provision of three-travel lanes in each direction and additional turn lanes at intersections. To enable this to occur, Valley St. would be narrowed to a three-lane section with bike lanes. Left turn lanes may be provided at key intersections, as needed, such as Westlake Avenue. These changes would reduce regional traffic on Valley St. while focusing traffic to/from I-5 onto Mercer St. Mercer St. would also be reconnected across Aurora Ave. N., as would Thomas St.

<sup>7</sup> The 1,165-space amount is based on the total 1,226 stalls reduced factored by a practical capacity factor that takes into account the efficiency lost by circulating the garage in search of a vacant stall.

The Aurora Avenue improvements would reconfigure access to/from Aurora Avenue to the north of the Battery Street tunnel. The current proposal would lower SR 99 between Roy Street and Denny Way, and would reconnect several streets across SR 99, including Republican Street, Harrison Street, and Thomas Street. As part of these improvements, the Broad Street underpass would be filled in adjacent to the project site. In addition, the connections between SR 99 and the surface street network would be modified to provide additional access points at Roy Street and Republican Street. Included in the reconnection of the streets across Aurora Avenue is the reconnection of 6<sup>th</sup> Avenue between Roy Street and Harrison Street, through the proposed project site. While these changes would improve some of the traffic movements in the project area, as discussed below, the reconnection of 6<sup>th</sup> Avenue would divide the project site and undermine the project goal of creating a unified office campus.

With these improvements in place, there could be direct site access to/from Republican Street. In addition, the proposed access to/from Harrison Street would be able to provide full access, potentially as a signalized fourth leg to the intersection with Taylor Avenue. With additional dispersion of access, the pressure of the added traffic load from the project would be more immediately dispersed, with less localized impact issues. Even if site access were to remain unchanged from the *Alternative 3* build-out, the *Alternative 4* build-out transportation infrastructure would offer more “grid-based” options for access to/from and through the South Lake Union neighborhood to the east, and would likely result in better operating conditions along 5<sup>th</sup> Avenue, abutting the site to the west. A summary of the proposed conceptual changes to the transportation system in the immediate vicinity of the project site is illustrated on Figure 15.

With the reconnection of 6<sup>th</sup> Avenue, freeway-destined project traffic would still impact Mercer Street, but would also have the option of using other streets crossing SR 99 such as Republican or Harrison Streets, before accessing Mercer and the freeway. This would reduce project impacts to the Mercer Street corridor.

At this time, the improvements have been identified in concept, but the specific changes to the street system have not yet been designed. Also, funding for these improvements has not yet become available. Therefore, it was not possible to conduct a detailed LOS analysis for the *Alternative 4* build-out as has been documented above for both the other *Alternatives*.

## Construction Impacts

Construction of the *Alternative 2* build-out, beginning beyond 2010, would generate truck and vehicle traffic associated with earthwork and excavation, delivery of materials to the site and similar types of activities. The highest concentration of truck traffic expected to occur during construction would coincide with the earthwork and excavation activities. At this time it is not known how much material would be removed in conjunction with *Alternative 2* build-out. However, the amount of traffic associated with construction is expected to be less than the total development related traffic volumes anticipated.

Construction employees would be required to park off-site in neighboring parking garages or parking lots (including the Seattle Center Parking Garage). On-site parking for construction employees could also be provided in the parking stalls constructed with the initial phase, dependent on the construction schedule and the provision of additional parking stalls constructed as part of the initial phase.

Construction impacts associated with the *Alternative 3* build-out are anticipated to be similar to *Alternative 2* build-out, although would likely be slightly lower.

While construction may cause inconveniences proximate to the site, the impacts would be temporary and are not expected to extend to the surrounding study area. To minimize potential impacts, specific routing plans and scheduling could be identified through a construction vehicle routing plan and coordination with SDOT.

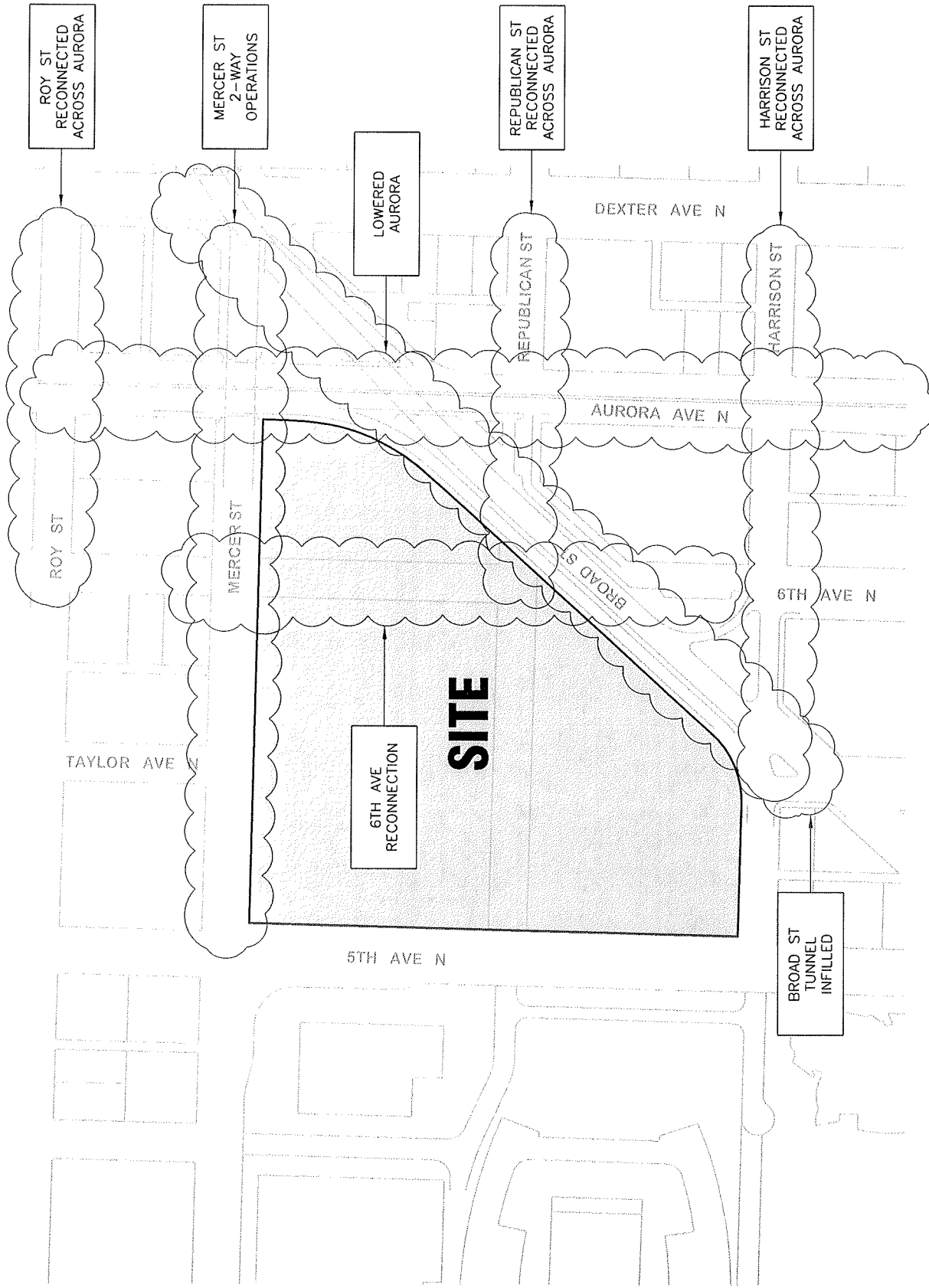
## Area Transportation Impacts

Additional traffic generated by the build-out *Alternatives* is anticipated to cause one additional study intersections to degrade to LOS F with the project. Also, the addition of project traffic volumes at those intersections which already operate at LOS F with the *Alternative 1 (No Action)* build-out is likely to increase delay during the AM and PM peak hours. The following list identifies the impact of the project and potential improvements at these intersections;

- **#2. 9<sup>th</sup> Ave/Broad St** (AM peak hour only) - this intersection would degrade from LOS D to LOS F during the AM peak hour with the build-out project *Alternatives*. The South Lake Union Transportation Study has identified solutions to address both the existing and future operational deficiencies at this intersection.
- **#3. Westlake Ave/Valley St** (AM and PM peak hours) - this intersection would degrade from LOS E to F during the AM peak hour with the build-out project *Alternatives*, and would continue to operate at LOS F during PM peak hour with or without the build-out project *Alternatives*. The South Lake Union Transportation Study has identified solutions to address both the existing and future operational deficiencies at this intersection.
- **#7. Dexter Ave/Mercer St** (PM peak hour only) – this intersection would continue to operate at LOS F during the PM peak hour with or without the build-out project *Alternatives*. Improvements for this intersection have been identified as part of the South Lake Union Transportation Plan.
- **#9. Westlake Ave/Mercer St** (PM peak hour only) – this intersection would continue to operate at LOS F during the PM peak hour with or without the build-out project *Alternatives*. Improvements for this intersection have been identified as part of the South Lake Union Transportation Plan.
- **#10. Fairview Ave/Mercer St** (AM and PM peak hours) – this intersection would continue to operate at LOS F during both the AM and PM peak hours with or without the build-out project *Alternatives*. Improvements for this intersection have been identified as part of the South Lake Union Transportation Plan.
- **#18. Denny Way/Aurora Ave** (AM and PM peak hours) – this intersection would degrade from LOS E to F during the AM peak hour with the build-out project *Alternatives*, and would continue to operate at LOS F during PM peak hour with or without the build-out project *Alternatives*. Improvements for this intersection have been identified as part of the Aurora Avenue improvements included in the Alaskan Way Viaduct project.



NOT TO SCALE



**Figure 15**

Site Vicinity Infrastructure Improvements

500 Fifth Avenue North



## Secondary and Cumulative Impacts

Due to the nature of the transportation analysis conducted for the 500 Fifth Avenue North project, secondary and cumulative impacts have been addressed as part of the primary analysis documented above.

## Mitigation Measures

All of the development *Alternatives* have common impacts that could be mitigated with a Transportation Management Program (TMP). In addition, the City's South Lake Union Transportation Plan identifies specific intersection and corridor improvements that were determined to address the long term vision for transportation infrastructure in South Lake Union. Therefore, the following describes potential mitigation measures that could be implemented to reduce or offset the impacts associated with the project.

### Transportation Management Program

The City will require that a TMP be developed for the proposed project consistent with the requirements of SDO's Director's Rule 94-3, and the CityDPD's Director's Rule 14-2002 regarding TMPs. An appropriate TMP goal, progressive over time, will be identified through future discussions with City of Seattle DPD and SDO staff as project plans are further developed. The TMP goals and supporting elements will be consistent with all City TMP requirements.

### South Lake Union Transportation Plan

To the extent that the City has identified a transportation vision for the South Lake Union area that includes a substantial number of planned improvements, including conversion of Mercer Street to a two-way boulevard, it is possible that the City could propose that the project be conditioned to participate in funding these improvements on some level, depending on the identified level of impact. The actual level of participation would be the subject of further analysis and discussion, should it be proposed.

### Other Traffic Mitigation

In addition to the above, the following intersection improvement could be considered:

**#21. Fairview Ave/Denny Way** (PM peak hour only) – this intersection would degrade from LOS E to LOS F during the PM peak hour with the addition of traffic generated by the build-out project *Alternatives*. However, the addition of project traffic generated by the build-out of *Alternatives 2 and 3* would increase intersection traffic volumes by 154 vehicles (3.5 percent) and 138 vehicles (3.1 percent) respectively during the PM peak hour. Optimization of the signal timing (cycle length and splits) at this intersection would improve PM peak hour operations at this intersection to LOS E with the *Alternative 2* build-out and *Alternative 3* build-out.

## Potentially Unavoidable Adverse Impacts

This section of the report documents those intersections where traffic generated by the development *Alternatives* would cause unavoidable adverse impacts at study intersections. Impacts at the following locations may be significant, with or without the mitigation measures identified.

- **#22. Denny Way/Stewart St** (AM and PM peak hours) – this intersection would continue to operate at LOS F during both the AM and PM peak hours with or without the build-out project *Alternatives*. However, the addition of project traffic generated by the build-out of *Alternatives 2 and 3* would increase intersection traffic volumes by between 143 (2.8 percent) and 158 (3.1 percent) during the AM peak hour, and between 133 (3.1 percent) and 149 (3.4 percent) during the PM peak hour. Improvement options are limited due to capacity restraints and its close proximity to the I-5 entrance and exit; these constraints could result in a possible unavoidable adverse impact.
- **#24. Howell St/Yale Ave** (AM and PM peak hours) – this intersection would continue to operate at LOS F during both the AM and PM peak hours with or without the build-out project *Alternatives*. However, the addition of project traffic generated by the build-out of *Alternatives 2 and 3* would increase intersection traffic volumes by between 7 (0.4 percent) and 8 (0.4 percent) during the AM peak hour, and between 80 (2.5 percent) and 89 (2.7 percent) during the PM peak hour. Beyond optimization of signal timing, which would not offset project impacts, mitigation options are limited at this intersection and the project could result in a possible unavoidable adverse impact.

## Appendix A: LOS Definitions

## Highway Capacity Manual, 2000

**Signalized intersection** level of service (LOS) is defined in terms of the average total vehicle delay of all movements through an intersection. Vehicle delay is a method of quantifying several intangible factors, including driver discomfort, frustration, and lost travel time. Specifically, LOS criteria are stated in terms of average delay per vehicle during a specified time period (for example, the PM peak hour). Vehicle delay is a complex measure based on many variables, including signal phasing (i.e., progression of movements through the intersection), signal cycle length, and traffic volumes with respect to intersection capacity. Table 1 shows LOS criteria for signalized intersections, as described in the *Highway Capacity Manual* (Transportation Research Board, Special Report 209, 2000).

**Table 1. Level of Service Criteria for Signalized Intersections**

Level of Service	Average Control Delay (sec/veh)	General Description (Signalized Intersections)
A	≤10	Free Flow
B	>10 - 20	Stable Flow (slight delays)
C	>20 - 35	Stable flow (acceptable delays)
D	>35 - 55	Approaching unstable flow (tolerable delay, occasionally wait through more than one signal cycle before proceeding)
E	>55 - 80	Unstable flow (intolerable delay)
F	>80	Forced flow (jammed)

**Unsignalized intersection** LOS criteria can be further reduced into two intersection types: all-way stop-controlled and two-way stop-controlled. All-way, stop-controlled intersection LOS is expressed in terms of the average vehicle delay of all of the movements, much like that of a signalized intersection. Two-way, stop-controlled intersection LOS is defined in terms of the average vehicle delay of an individual movement(s). This is because the performance of a two-way, stop-controlled intersection is more closely reflected in terms of its individual movements, rather than its performance overall. For this reason, LOS for a two-way, stop-controlled intersection is defined in terms of its individual movements. With this in mind, total average vehicle delay (i.e., average delay of all movements) for a two-way, stop-controlled intersection should be viewed with discretion. Table 2 shows LOS criteria for unsignalized intersections (both all-way and two-way, stop-controlled).

**Table 2. Level of Service Criteria for Unsignalized Intersections**

Level of Service	Average Control Delay (sec/veh)
A	0 - 10
B	>10 - 15
C	>15 - 25
D	>25 - 35
E	>35 - 50
F	>50

## Appendix B: LOS Worksheets

## Existing Conditions

# HCM Signalized Intersection Capacity Analysis 1: Roy St & 5th Ave

2005 Existing Conditions - AM Peak  
500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4	4	4	4	4	4	4	4	4	4	4	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	0.99	0.99	1.00	0.98	1.00	0.98	1.00	0.98	1.00	0.98	1.00	0.98
Flpb, ped/bikes	0.97	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt	0.99	1.00	1.00	0.97	1.00	0.97	1.00	0.97	1.00	0.97	1.00	0.97
Flt Protected	0.98	0.95	0.99	0.95	0.99	0.95	0.95	1.00	0.95	0.95	1.00	0.95
Satd. Flow (prot)	1421	1564	1328	1564	1328	1662	1430	1662	1430	1662	1430	1662
Flt Permitted	0.98	0.95	0.99	0.95	0.99	0.95	0.95	1.00	0.95	0.95	1.00	0.95
Satd. Flow (perm)	1421	1564	1328	1564	1328	1662	1430	1662	1430	1662	1430	1662
Volume (vph)	0	0	35	40	5	355	140	55	15	220	60	60
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	37	42	5	374	147	58	16	232	63	63
RTOR Reduction (vph)	0	0	0	1	0	0	7	0	0	0	7	0
Lane Group Flow (vph)	0	0	0	83	0	312	260	0	16	288	0	0
Confl. Peds. (#/hr)	0	0	7	20	14	14	12	12	12	28	28	28
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	6%	6%	6%	5%	5%	5%
Parking (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Split	Split	Split	Split	Split	Split
Protected Phases	6	6	6	6	6	6	4	4	4	8	8	8
Permitted Phases	6	6	6	6	6	6	4	4	4	8	8	8
Actuated Green, G (s)	33.0	53.0	53.0	53.0	53.0	53.0	36.0	36.0	36.0	36.0	36.0	36.0
Effective Green, g (s)	36.0	56.0	56.0	56.0	56.0	56.0	39.0	39.0	39.0	39.0	39.0	39.0
Actuated g/C Ratio	0.26	0.40	0.40	0.40	0.40	0.40	0.28	0.28	0.28	0.28	0.28	0.28
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lane Grp Cap (vph)	365	626	531	626	531	463	398	398	398	463	398	398
v/s Ratio Prot	0.06	0.20	0.20	0.20	0.20	0.01	c0.20	c0.20	c0.20	0.01	c0.20	c0.20
v/c Ratio	0.23	0.50	0.49	0.50	0.49	0.03	0.72	0.72	0.72	0.03	0.72	0.72
Uniform Delay, d1	41.0	31.5	31.3	31.5	31.3	36.8	45.6	45.6	45.6	36.8	45.6	45.6
Progression Factor	0.99	0.17	0.15	0.17	0.15	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.4	2.5	2.9	2.5	2.9	0.1	10.9	10.9	10.9	0.1	10.9	10.9
Delay (s)	42.1	7.9	7.6	7.9	7.6	36.9	56.5	56.5	56.5	36.9	56.5	56.5
Level of Service	D	A	A	A	A	D	E	E	E	D	E	E
Approach Delay (s)	0.0	42.1	42.1	42.1	42.1	42.1	55.5	55.5	55.5	42.1	55.5	55.5
Approach LOS	A	D	D	D	D	D	E	E	E	D	E	E
Intersection Summary												
HCM Average Control Delay	25.9											
HCM Volume to Capacity ratio	0.49											
Actuated Cycle Length (s)	140.0											
Intersection Capacity Utilization	52.2%											
Analysis Period (min)	15											
c Critical Lane Group												

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Synchro 6 Report  
1/17/2006

# HCM Signalized Intersection Capacity Analysis 2: Broad St & 9th Ave

2005 Existing Conditions - AM Peak  
500 Fifth Avenue North

Movement	EBT	EBR	WBL	WBT	WBR	SBL	SBT	SBR	SBR2
Lane Configurations	4↑		4↑			4↑↑		4	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	10	10	11	12	9	8	12
Total Lost time (s)	3.0	3.0	3.0	3.0		3.0	3.0	3.0	
Lane Util. Factor	0.95	1.00	0.95	1.00	0.95	0.91	1.00		
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00		
Flpb, ped/bikes	1.00	0.99	1.00	1.00	1.00	1.00	1.00		
Flt	0.92	1.00	0.99	1.00	0.85	1.00	0.85		
Flt Protected	1.00	0.95	1.00	0.99	1.00	0.99	1.00		
Satd. Flow (prot)	2794	1477	2942			3755	1223		
Flt Permitted	1.00	0.21	1.00			0.99	1.00		
Satd. Flow (perm)	2794	327	2942			3755	1223		
Volume (vph)	190	240	125	1600	120	220	755	85	5
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	202	255	133	1702	128	234	803	90	5
RTOR Reduction (vph)	191	0	0	0	0	0	0	1	0
Lane Group Flow (vph)	266	0	133	1830	0	0	1037	94	0
Confl. Peds. (#/hr)			50		50				
Heavy Vehicles (%)	3%	3%	2%	2%	2%	3%	3%	3%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0	2	0	0
Parking (#/hr)									
Turn Type		pm+pt			Split		20		
Protected Phases	1	2	1	2	3	3	3	3	
Permitted Phases		1	2						
Actuated Green, G (s)	16.5	72.8	78.3			30.7	30.7		
Effective Green, g (s)	19.0	77.8	80.8			33.2	33.2		
Actuated g/C Ratio	0.16	0.65	0.67			0.28	0.28		
Clearance Time (s)	5.5	5.5				5.5	5.5		
Vehicle Extension (s)	3.0	3.0				3.0	3.0		
Lane Grp Cap (Vph)	442	776	1981			1039	338		
v/s Ratio Prot	0.10	0.08	c0.62			c0.28	0.08		
v/s Ratio Perm		0.03							
v/c Ratio	0.60	0.17	0.92			1.00	0.28		
Uniform Delay, d1	47.0	14.1	16.9			43.4	34.0		
Progression Factor	1.00	0.22	0.49			1.00	1.00		
Incremental Delay, d2	6.0	0.1	6.6			27.2	0.4		
Delay (s)	52.9	3.1	14.8			70.6	34.4		
Level of Service	D	A	B			E	C		
Approach Delay (s)	52.9		14.0			67.6			
Approach LOS	D		B			E			
Intersection Summary									
HCM Average Control Delay	36.1 HCM Level of Service								
HCM Volume to Capacity ratio	0.95								
Actuated Cycle Length (s)	120.0 Sum of lost time (s)								
Intersection Capacity Utilization	81.2% ICU Level of Service								
Analysis Period (min)	15								
c Critical Lane Group									

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HCM Signalized Intersection Capacity Analysis  
3: Broad St & Westlake Ave

2005 Existing Conditions - AM Peak

500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4↑	4↑	4↑	4↑	4↑	4↑	4↑	4↑	4↑	4↑	4↑	4↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	12	12	10	12	12	10	12	12	12	12
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	0.91	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fit Protected	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	3104	4314	1439	1439	1439	2973	1425	1425	1425	1425	1425	1425
Fit Permitted	0.84	1.00	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (perm)	2626	4314	1439	1439	1439	2973	1425	1425	1425	1425	1425	1425
Volume (vph)	15	385	0	0	1715	730	45	170	235	0	0	0
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	16	401	0	0	1786	760	47	177	307	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	154	0	0	214	0	0	0
Lane Group Flow (vph)	0	417	0	0	1786	606	47	177	93	0	0	0
Conf. Peds. (#/hr)	50	50	50	50	50	50	50	50	50	50	50	50
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	2%	2%	0%	0%	0%
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	2	2	2	2	2	2	2	2	2	2	2	2
Permitted Phases	2	2	2	2	2	2	2	2	2	2	2	2
Actuated Green, G (s)	75.3	75.3	75.3	75.3	75.3	75.3	75.3	75.3	75.3	75.3	75.3	75.3
Effective Green, g (s)	77.8	77.8	77.8	77.8	77.8	77.8	77.8	77.8	77.8	77.8	77.8	77.8
Actuated g/C Ratio	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Clearance Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1703	2797	933	432	897	430	430	430	430	430	430	430
v/s Ratio Prot	0.16	0.41	0.42	0.03	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06
v/s Ratio Perm	0.24	0.64	0.65	0.11	0.20	0.22	0.22	0.22	0.22	0.22	0.22	0.22
Uniform Delay, d1	8.8	12.7	12.8	30.3	31.1	31.3	31.3	31.3	31.3	31.3	31.3	31.3
Progression Factor	1.01	0.63	0.42	0.63	0.62	1.12	1.12	1.12	1.12	1.12	1.12	1.12
Incremental Delay, d2	0.0	0.4	1.3	0.4	0.4	0.9	0.9	0.9	0.9	0.9	0.9	0.9
Delay (s)	9.0	8.4	6.7	19.6	19.7	36.1	36.1	36.1	36.1	36.1	36.1	36.1
Level of Service	A	A	A	B	B	D	D	D	D	D	D	D
Approach Delay (s)	9.0	7.9	7.9	29.2	29.2	36.1	36.1	36.1	36.1	36.1	36.1	36.1
Approach LOS	A	A	A	C	C	D	D	D	D	D	D	D
Intersection Summary												
HCM Average Control Delay	11.2											
HCM Volume to Capacity ratio	0.51											
Actuated Cycle Length (s)	120.0											
Intersection Capacity Utilization	78.5%											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis  
4: Valley St & Fairview Ave

2005 Existing Conditions - AM Peak

500 Fifth Avenue North

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	4↑	4↑	4↑	4↑	4↑	4↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	10	12	12	12	12	12
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	1.00	1.00	1.00	0.95	1.00
Fit Protected	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	2944	1411	812	3124	4491	1425
Fit Permitted	1.00	1.00	0.18	1.00	0.95	1.00
Satd. Flow (perm)	2944	1411	150	3124	4491	1425
Volume (vph)	590	20	5	470	1870	595
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	628	21	5	500	1969	633
RTOR Reduction (vph)	0	6	0	0	0	11
Lane Group Flow (vph)	628	15	5	500	1969	622
Heavy Vehicles (%)	3%	3%	100%	4%	2%	2%
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	3	3	4	2	2
Permitted Phases	4	4	4	4	2	2
Actuated Green, G (s)	28.0	28.0	37.0	42.0	68.0	82.0
Effective Green, g (s)	30.0	30.0	41.0	44.0	70.0	84.0
Actuated g/C Ratio	0.25	0.25	0.34	0.37	0.58	0.70
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	736	353	112	1145	2620	998
v/s Ratio Prot	c0.21	0.00	0.16	c0.44	c0.44	c0.44
v/s Ratio Perm	0.01	0.01	0.01	0.01	0.01	0.01
v/c Ratio	0.85	0.04	0.04	0.44	0.76	0.62
Uniform Delay, d1	42.9	34.1	27.4	28.7	18.7	9.6
Progression Factor	1.18	1.25	1.00	1.00	1.26	1.30
Incremental Delay, d2	11.9	0.2	0.2	0.3	0.2	0.1
Delay (s)	62.6	43.0	27.6	28.9	23.7	12.5
Level of Service	E	D	C	C	C	B
Approach Delay (s)	61.9	28.9	21.0	21.0	21.0	21.0
Approach LOS	E	C	C	C	C	C
Intersection Summary						
HCM Average Control Delay	29.1					
HCM Volume to Capacity ratio	0.76					
Actuated Cycle Length (s)	120.0					
Intersection Capacity Utilization	65.7%					
Analysis Period (min)	15					
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis  
5: Mercer St & 1st Avenue

2005 Existing Conditions - AM Peak

500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4T						T			T		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0			3.0			3.0			3.0		
Lane Util. Factor	0.95			1.00			1.00			0.95		
Frt	1.00			1.00			0.94					
Frt Protected	1.00			0.95			1.00					
Satd. Flow (prot)	3297			1641			2877					
Frt Permitted	1.00			0.95			1.00					
Satd. Flow (perm)	3297			1641			2877					
Volume (vph)	40	1005	0	0	0	0	70	185	115	0	0	0
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	42	1047	0	0	0	0	73	193	120	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	68	0	0	0	0
Lane Group Flow (vph)	0	1089	0	0	0	0	73	245	0	0	0	0
Heavy Vehicles (%)	3%	3%	3%	0%	0%	0%	0%	10%	10%	0%	0%	0%
Parking (#/hr)	3						8		8			
Turn Type	Perm			Perm								
Protected Phases	1			2								
Permitted Phases	1			2								
Actuated Green, G (s)	46.0			26.0			26.0					
Effective Green, g (s)	47.0			27.0			27.0					
Actuated g/C Ratio	0.59			0.34			0.34					
Clearance Time (s)	4.0			4.0			4.0					
Lane Grp Cap (vph)	1937			554			971					
v/s Ratio Prot				c0.09								
v/s Ratio Perm	0.33			0.04								
v/c Ratio	0.56			0.13			0.25					
Uniform Delay, d1	10.2			18.4			19.2					
Progression Factor	1.00			1.00			1.00					
Incremental Delay, d2	1.2			0.5			0.6					
Delay (s)	11.3			18.9			19.8					
Level of Service	B			B			B					
Approach Delay (s)	11.3			0.0						0.0		
Approach LOS	B			A			B			A		
Intersection Summary												
HCM Average Control Delay	13.5			HCM Level of Service			B					
HCM Volume to Capacity ratio	0.45											
Actuated Cycle Length (s)	80.0			Sum of lost time (s)			6.0					
Intersection Capacity Utilization	50.6%			ICU Level of Service			A					
Analysis Period (min)	15											
Critical Lane Group												

HCM Signalized Intersection Capacity Analysis  
6: Mercer St & 5th Ave

2005 Existing Conditions - AM Peak

500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	4TTH												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width	12	11	11	12	12	12	12	11	11	11	11	12	
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Util. Factor	0.86	1.00	1.00	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	
Frb, ped/bikes	1.00	0.87	1.00	1.00	0.92	1.00	1.00	0.92	1.00	1.00	0.92	1.00	
Fipb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Fit	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	
Fit Protected	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.99	
Satd. Flow (prot)	5720	1303	1303	5720	1303	1303	5720	1303	1303	5720	1303	1303	
Fit Permitted	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.32	0.89	
Satd. Flow (perm)	5720	1303	1303	5720	1303	1303	5720	1303	1303	5720	1303	1303	
Volume (vph)	15	1015	140	0	0	0	0	530	135	90	185	0	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Adj. Flow (vph)	16	1068	147	0	0	0	0	558	142	95	195	0	
RTOR Reduction (vph)	0	0	36	0	0	0	0	0	88	0	0	0	
Lane Group Flow (vph)	0	1084	111	0	0	0	0	558	54	68	222	0	
Confl. Peds. (#/hr)	30	35	35	30	35	35	30	35	25	25	95	95	
Heavy Vehicles (%)	4%	4%	4%	0%	0%	0%	0%	5%	5%	5%	5%	5%	
Bus Blockages (#/hr)	0	0	0	0	0	0	0	18	0	0	18	0	
Parking (#/hr)	25	25	25	25	25	25	25	25	25	25	25	25	
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	
Protected Phases	2	2	2	2	2	2	2	2	2	2	2	2	
Permitted Phases	2	4	4	4	4	4	4	4	4	4	4	4	
Actuated Green, G (s)	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	
Effective Green, g (s)	46.0	46.0	46.0	46.0	46.0	46.0	46.0	46.0	46.0	46.0	46.0	46.0	
Actuated g/C Ratio	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	
Lane Grp Cap (vph)	1879	428	428	1879	428	428	1879	428	428	1879	428	428	
v/s Ratio Prot	0.19	0.08	0.08	0.19	0.08	0.08	0.19	0.08	0.08	0.19	0.08	0.08	
v/s Ratio Perm	0.58	0.26	0.26	0.58	0.26	0.26	0.58	0.26	0.26	0.58	0.26	0.26	
v/c Ratio	0.38	0.26	0.26	0.38	0.26	0.26	0.38	0.26	0.26	0.38	0.26	0.26	
Uniform Delay, d1	38.9	34.5	34.5	38.9	34.5	34.5	38.9	34.5	34.5	38.9	34.5	34.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.3	1.5	1.5	1.3	1.5	1.5	1.3	1.5	1.5	1.3	1.5	1.5	
Delay (s)	40.2	36.0	36.0	40.2	36.0	36.0	40.2	36.0	36.0	40.2	36.0	36.0	
Level of Service	D	D	D	D	D	D	D	D	D	D	D	D	
Approach Delay (s)	39.7	0.0	0.0	39.7	0.0	0.0	39.7	0.0	0.0	39.7	0.0	0.0	
Approach LOS	D	A	A	D	A	A	D	A	A	D	A	A	
Intersection Summary													
HCM Average Control Delay	39.4	HCM Level of Service		D									
HCM Volume to Capacity ratio	0.42												
Actuated Cycle Length (s)	140.0	Sum of lost time (s)		6.0									
Intersection Capacity Utilization	55.4%	ICU Level of Service		B									
Analysis Period (min)	15												
Critical Lane Group													

HCM Signalized Intersection Capacity Analysis  
 7: Mercer St & Dexter Avenue  
 2005 Existing Conditions - AM Peak  
 500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBR	NBT	NBR	SBT	NEL	NER	NER2
Lane Configurations	4TTL	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	12	12	12	10	11	10	12	12	12	12
Lane Width	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Total Lost time (s)	0.86	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95
Lane Util. Factor	0.99	0.86	1.00	0.85	1.00	0.87	1.00	0.87	1.00	0.85
Flt Protected	1.00	1.00	1.00	1.00	0.95	1.00	0.99	1.00	1.00	1.00
Satd. Flow (prot)	5709	1382	2861	1326	1501	3217	1439	1341	1341	1341
Flt Permitted	1.00	1.00	1.00	1.00	0.54	1.00	0.99	1.00	1.00	1.00
Satd. Flow (perm)	5709	1382	2861	1326	860	3217	1439	1341	1341	1341
Volume (vph)	110	1480	75	30	150	55	225	525	25	260
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	125	1659	85	34	170	62	256	597	28	295
RTOR Reduction (vph)	0	0	0	19	0	41	0	0	0	1
Lane Group Flow (vph)	0	1869	0	15	170	21	256	597	177	151
Heavy Vehicles (%)	2%	2%	2%	7%	6%	6%	1%	1%	3%	3%
Turn Type	Perm	1	custom	1	4	3	7	2	2	2
Protected Phases	1	1	4	4	7	7	2	2	2	2
Permitted Phases	1	1	4	4	7	7	2	2	2	2
Actuated Green, G (s)	60.0	30.0	30.0	48.0	48.0	48.0	14.0	14.0	14.0	14.0
Effective Green, g (s)	63.0	33.0	33.0	51.0	51.0	51.0	17.0	17.0	17.0	17.0
Actuated g/C Ratio	0.45	0.45	0.24	0.24	0.36	0.36	0.12	0.12	0.12	0.12
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lane Grp Cap (vph)	2569	622	674	313	382	1172	175	163	163	163
v/s Ratio Prot	0.01	0.06	0.02	0.07	0.19	0.12	0.11	0.11	0.11	0.11
v/s Ratio Perm	0.33	0.73	0.02	0.25	0.07	0.67	0.51	1.01	0.93	0.93
Uniform Delay, d1	31.5	21.4	43.5	41.6	35.2	34.7	61.5	60.9	60.9	60.9
Progression Factor	0.86	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.8	0.1	0.9	0.4	9.0	1.6	71.0	53.4	53.4	53.4
Delay (s)	29.0	21.5	44.4	42.0	44.3	36.3	132.5	114.3	114.3	114.3
Level of Service	C	C	D	D	D	D	F	F	F	F
Approach Delay (s)	29.0	43.7	38.7	124.1	124.1	124.1	124.1	124.1	124.1	124.1
Approach LOS	C	C	D	D	D	D	F	F	F	F
Intersection Summary										
HCM Average Control Delay	41.9									
HCM Volume to Capacity ratio	0.74									
Actuated Cycle Length (s)	140.0									
Intersection Capacity Utilization	71.9%									
Analysis Period (min)	15									
c Critical Lane Group										

HCM Signalized Intersection Capacity Analysis  
 8: Mercer St & 9th Ave  
 2005 Existing Conditions - AM Peak  
 500 Fifth Avenue North

Movement	EBT	EBR	SBL	SBT	SBR	SER
Lane Configurations	1TTL	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	11	12	12	9	12	11
Lane Width	3.0	3.0	3.0	3.0	3.0	3.0
Total Lost time (s)	0.86	1.00	0.91	0.91	1.00	0.91
Lane Util. Factor	0.99	0.86	1.00	1.00	0.87	0.85
Flt Protected	1.00	1.00	1.00	0.95	1.00	0.99
Satd. Flow (prot)	5548	1251	2514	2514	1251	2514
Flt Permitted	1.00	1.00	0.95	0.98	1.00	0.98
Satd. Flow (perm)	5548	1251	2514	2514	1251	2514
Volume (vph)	1835	60	600	455	30	0
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	1973	65	645	489	32	0
RTOR Reduction (vph)	3	0	9	9	0	0
Lane Group Flow (vph)	2035	0	367	781	0	0
Heavy Vehicles (%)	2%	2%	4%	4%	4%	0%
Bus Blockages (#/hr)	0	0	0	2	0	0
Turn Type	Perm	1	Perm	2	custom	2
Protected Phases	1	1	2	2	2	2
Permitted Phases	1	1	2	2	2	2
Actuated Green, G (s)	71.2	37.8	37.8	40.3	40.3	40.3
Effective Green, g (s)	73.7	40.3	40.3	43.4	43.4	43.4
Actuated g/C Ratio	0.61	0.34	0.34	0.34	0.34	0.34
Clearance Time (s)	5.5	5.5	5.5	5.5	5.5	5.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	3407	420	844	844	844	844
v/s Ratio Prot	0.37	0.29	0.31	0.31	0.31	0.31
v/s Ratio Perm	0.60	0.87	0.93	0.93	0.93	0.93
Uniform Delay, d1	14.1	37.5	38.4	38.4	38.4	38.4
Progression Factor	1.00	0.48	0.50	0.50	0.50	0.50
Incremental Delay, d2	0.8	10.1	9.2	9.2	9.2	9.2
Delay (s)	14.9	28.1	28.3	28.3	28.3	28.3
Level of Service	B	C	C	C	C	C
Approach Delay (s)	14.9	28.2	28.2	28.2	28.2	28.2
Approach LOS	B	C	C	C	C	C
Intersection Summary						
HCM Average Control Delay	19.7					
HCM Volume to Capacity ratio	0.71					
Actuated Cycle Length (s)	120.0					
Intersection Capacity Utilization	60.3%					
Analysis Period (min)	15					
i Phase conflict between lane groups						
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis  
 9: Mercer St & Westlake Ave  
 2005 Existing Conditions - AM Peak  
 500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4TTL						4TTL					
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	12	12	12	12	12	11	12	12	12	12
Total Lost time (s)	3.0						3.0	3.0				
Lane Util. Factor	0.86						0.86	0.86				
Flt	1.00						1.00	0.85				
Flt Protected	1.00						1.00	1.00				
Satd. Flow (prot)	5548						4101	1202				
Flt Permitted	1.00						1.00	1.00				
Satd. Flow (perm)	5548						4101	1202				
Volume (vph)	270	2530	0	0	0	0	0	270	65	0	0	0
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	281	2635	0	0	0	0	0	281	68	0	0	0
RTOR Reduction (vph)	0	7	0	0	0	0	0	0	3	0	0	0
Lane Group Flow (vph)	0	2909	0	0	0	0	0	281	65	0	0	0
Heavy Vehicles (%)	2%	2%	2%	0%	0%	0%	4%	4%	4%	0%	0%	0%
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	1						2					
Permitted Phases	1						2					
Actuated Green, G (s)	94.7						14.3	14.3				
Effective Green, g (s)	97.2						16.8	16.8				
Actuated g/C Ratio	0.81						0.14	0.14				
Clearance Time (s)	5.5						5.5	5.5				
Vehicle Extension (s)	3.0						3.0	3.0				
Lane Grp Cap (vph)	4494						574	168				
v/s Ratio Prot							c0.07					
v/s Ratio Perm	0.52						0.05					
v/c Ratio	0.65						0.49	0.39				
Uniform Delay, d1	4.6						47.6	46.9				
Progression Factor	0.55						1.03	1.03				
Incremental Delay, d2	0.6						0.7	1.5				
Delay (s)	3.1						49.5	49.8				
Level of Service	A						D	D				
Approach Delay (s)	3.1			0.0		A	49.6			0.0		A
Approach LOS	A			A		A	D			A		A
Intersection Summary												
HCM Average Control Delay				8.1								A
HCM Volume to Capacity ratio				0.62								A
Actuated Cycle Length (s)				120.0								6.0
Intersection Capacity Utilization				58.3%								B
Analysis Period (min)				15								
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis  
 10: Mercer St & Fairview Ave  
 2005 Existing Conditions - AM Peak  
 500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4TTL						4TTL					
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	12	12	12	12	12	10	12	12	12	12
Total Lost time (s)	3.0	3.0					3.0	3.0				
Lane Util. Factor	0.91	1.00					0.97	0.88				
Flt	1.00	0.85					1.00	0.85				
Flt Protected	1.00	1.00					0.95	1.00				
Satd. Flow (prot)	4423	1425					3120	2533				
Flt Permitted	1.00	1.00					0.95	1.00				
Satd. Flow (perm)	4423	1425					3120	2533				
Volume (vph)	10	1920	360	135	1165	2305	190	245				
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97				
Adj. Flow (vph)	10	1979	371	139	1201	2376	196	253				
RTOR Reduction (vph)	0	0	11	0	0	119	0	1				
Lane Group Flow (vph)	0	1969	499	0	1201	2257	196	257				
Heavy Vehicles (%)	2%	2%	2%	2%	1%	1%	3%	3%				
Turn Type	Split	Split	Prot	Prot	Prot	Prot	Prot	Prot				
Protected Phases	11	1	1	1	2	1	2	1				
Permitted Phases												
Actuated Green, G (s)	46.3	46.3			37.5	89.3	15.7	58.7				
Effective Green, g (s)	48.8	48.8			40.0	91.8	22.2	65.2				
Actuated g/C Ratio	0.41	0.41			0.33	0.76	0.18	0.54				
Clearance Time (s)	5.5	5.5			5.5		9.5					
Vehicle Extension (s)	3.0	3.0			3.0		3.0					
Lane Grp Cap (vph)	1799	580			1040	1938	287	1350				
v/s Ratio Prot	0.45	0.35			0.38	c0.89	c0.13	0.10				
v/s Ratio Perm												
v/c Ratio	1.11	0.86			1.15	1.16	0.68	0.19				
Uniform Delay, d1	35.6	32.5			40.0	14.1	45.6	14.0				
Progression Factor	0.81	0.78			1.00	1.00	1.00	1.00				
Incremental Delay, d2	55.7	14.3			80.8	80.1	6.6	0.1				
Delay (s)	84.7	39.7			120.8	94.2	52.2	14.0				
Level of Service	F	D			F	F	D	B				
Approach Delay (s)	75.5						30.5					
Approach LOS	E						C					
Intersection Summary												
HCM Average Control Delay				87.3								F
HCM Volume to Capacity ratio				1.07								
Actuated Cycle Length (s)				120.0								6.0
Intersection Capacity Utilization				152.2%								H
Analysis Period (min)				15								
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis  
11: Republican St & 5th Ave

2005 Existing Conditions - AM Peak  
500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	0.95	0.95	1.00	0.91	1.00	0.91	1.00	0.95	1.00	0.95	0.95
Frpb, ped/bikes	1.00	0.97	1.00	1.00	1.00	1.00	1.00	1.00	0.99	1.00	0.99	1.00
Flpb, ped/bikes	0.98	1.00	0.73	1.00	1.00	0.98	1.00	0.98	1.00	0.98	1.00	1.00
Flt	1.00	0.85	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.98	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1253	1079	1194	4637	1591	3230						
Flt Permitted	0.98	1.00	0.57	1.00	0.39	1.00						
Satd. Flow (perm)	1253	1079	718	4637	645	3230						
Volume (vph)	0	0	0	5	5	15	615	30	10	285	5	5
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	0	0	0	5	5	15	628	31	10	291	5	5
RTOR Reduction (vph)	0	0	0	0	0	4	0	2	0	0	0	0
Lane Group Flow (vph)	0	0	0	10	1	15	657	0	10	296	0	0
Confl. Peds. (#/hr)	10	20	20	10	75	20	20	20	20	75	75	75
Heavy Vehicles (%)	0%	0%	0%	33%	33%	33%	7%	7%	7%	7%	7%	7%
Parking (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	6	6	6	8	8	8	8	8	8	8	8	8
Permitted Phases	6	6	6	8	8	8	8	8	8	8	8	8
Actuated Green, G (s)	20.0	20.0	109.0	109.0	109.0	109.0	109.0	109.0	109.0	109.0	109.0	109.0
Effective Green, g (s)	22.0	22.0	112.0	112.0	112.0	112.0	112.0	112.0	112.0	112.0	112.0	112.0
Actuated g/C Ratio	0.16	0.16	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Clearance Time (s)	5.0	5.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	197	170	574	3710	516	2584						
v/s Ratio Prot	0.01	0.00	0.02	0.02	0.02	0.09						
v/s Ratio Perm	0.05	0.00	0.03	0.18	0.02	0.11						
Uniform Delay, d1	50.1	49.8	2.9	3.3	2.8	3.1						
Progression Factor	1.00	1.00	2.97	3.09	0.94	1.28						
Incremental Delay, d2	0.1	0.0	0.1	0.1	0.1	0.1						
Delay (s)	50.2	49.8	8.6	10.1	2.7	4.0						
Level of Service	D	D	A	B	A	A						
Approach Delay (s)	50.1	49.8	8.6	10.1	2.7	4.0						
Approach LOS	A	A	B	B	A	A						
Intersection Summary												
HCM Average Control Delay	8.8											
HCM Volume to Capacity ratio	0.16											
Actuated Cycle Length (s)	140.0											
Intersection Capacity Utilization	28.2%											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis  
12: Harrison St & 5th Ave

2005 Existing Conditions - AM Peak  
500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	1.00	1.00	1.00	1.00	0.88	1.00	0.95	1.00	0.95	1.00	0.95	0.95
Frpb, ped/bikes	1.00	0.91	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	0.87	1.00	0.93	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt	1.00	0.92	1.00	0.85	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.95	1.00	0.96	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	1687	1501	1516	2720	1357	2919						
Flt Permitted	0.69	1.00	0.79	1.00	0.54	1.00						
Satd. Flow (perm)	1228	1501	1253	2720	778	2919						
Volume (vph)	5	5	5	45	10	405	10	235	5	5	300	5
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	5	5	5	49	11	445	11	258	5	5	330	5
RTOR Reduction (vph)	0	4	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	5	6	0	60	445	11	263	0	0	340	0	0
Confl. Peds. (#/hr)	100	100	100	100	185	185	115	115	185	185	185	185
Heavy Vehicles (%)	7%	7%	7%	1%	1%	1%	19%	19%	19%	8%	8%	8%
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	2	2	2	6	6	6	8	8	8	8	8	8
Permitted Phases	2	2	2	6	6	6	8	8	8	8	8	8
Actuated Green, G (s)	24.6	24.6	24.6	24.6	24.6	24.6	105.4	105.4	105.4	105.4	105.4	105.4
Effective Green, g (s)	25.6	25.6	25.6	25.6	25.6	25.6	108.4	108.4	108.4	108.4	108.4	108.4
Actuated g/C Ratio	0.18	0.18	0.18	0.18	0.18	0.18	0.77	0.77	0.77	0.77	0.77	0.77
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	225	274	229	497	602	2260						
v/s Ratio Prot	0.00	0.00	0.00	0.05	0.01	0.09						
v/s Ratio Perm	0.02	0.02	0.02	0.26	0.90	0.02	0.12	0.12	0.12	0.12	0.12	0.12
Uniform Delay, d1	46.9	46.9	49.1	55.9	3.6	3.9						
Progression Factor	1.00	1.00	1.00	1.00	0.42	0.44						
Incremental Delay, d2	0.0	0.0	0.6	18.4	0.1	0.1						
Delay (s)	47.0	47.0	49.7	74.3	1.6	1.8						
Level of Service	D	D	D	E	A	A						
Approach Delay (s)	47.0	47.0	49.7	74.3	1.6	1.8						
Approach LOS	D	D	D	E	A	A						
Intersection Summary												
HCM Average Control Delay	33.2											
HCM Volume to Capacity ratio	0.29											
Actuated Cycle Length (s)	140.0											
Intersection Capacity Utilization	50.6%											
Analysis Period (min)	15											
c Critical Lane Group												



HCM Unsignalized Intersection Capacity Analysis 2005 Existing Conditions - AM Peak  
13: Harrison St & Broad St 500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Grade	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Volume (veh/h)	0	0	5	0	0	0	0	310	5	0	1140	410
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Hourly Flow rate (vph)	0	0	6	0	0	0	0	348	6	0	1281	461
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None											
Median storage (veh)												
Upstream signal (ft)	623											
pX, platoon unblocked												
vC, conflicting volume												
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
IC, unblocked vol												
IC, single (s)												
IC, 2 stage (s)												
IF (s)												
p0 queue free %												
cM capacity (veh/h)												
Direction Lane #												
Volume Total												
Volume Left												
Volume Right												
cSH												
Volume to Capacity												
Queue Length 95th (ft)												
Control Delay (s)												
Lane LOS												
Approach Delay (s)												
Approach LOS												
Intersection Summary												
Average Delay	0.0											
Intersection Capacity Utilization	55.1%											
Analysis Period (min)	15											

HCM Signalized Intersection Capacity Analysis 2005 Existing Conditions - AM Peak  
14: 5th Ave & Broad St 500 Fifth Avenue North

Movement	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	12	12	11	11	11	11	12	11	11	12
Total Lost time (s)												
Lane Util. Factor												
Flpb. ped/bikes												
Flpb. ped/bikes												
Flt Protected												
Satd. Flow (prot)												
Flt Permitted												
Satd. Flow (perm)												
Volume (vph)												
Peak-hour factor PHF												
Adj. Flow (vph)												
RTOR Reduction (vph)												
Lane Group Flow (vph)												
Conf. Peds. (#/hr)												
Heavy Vehicles (%)												
Bus Blockages (#/hr)												
Turn Type												
Protected Phases												
Permitted Phases												
Actuated Green, G (s)												
Effective Green, g (s)												
Actuated g/C Ratio												
Clearance Time (s)												
Lane Grp. Cap (vph)												
v/s Ratio Prot												
v/s Ratio Perm												
v/c Ratio												
Uniform Delay, d1												
Progression Factor												
Incremental Delay, d2												
Delay (s)												
Level of Service												
Approach Delay (s)												
Approach LOS												
Intersection Summary												
HCM Average Control Delay	44.2											
HCM Volume to Capacity ratio	0.50											
Actuated Cycle Length (s)	140.0											
Intersection Capacity Utilization	61.0%											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis  
 15: Denny Way & 1st Avenue  
 2005 Existing Conditions - AM Peak  
 500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SBL	SBR	NWL	NWR	
Lane Configurations	11	11	11	11	11	11	11	11	11	11	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Flt	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	
Flt Protected	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Satd. Flow (prot)	3439	3439	3439	3439	3439	3439	3439	3439	3439	3439	
Flt Permitted	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Satd. Flow (perm)	3439	3439	3439	3439	3439	3439	3439	3439	3439	3439	
Volume (vph)	0	1735	250	0	795	310	0	0	155	10	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	
Adj. Flow (vph)	0	1789	258	0	820	320	0	0	160	10	
RTOR Reduction (vph)	0	11	0	0	70	0	0	0	0	0	
Lane Group Flow (vph)	0	2036	0	0	1070	0	0	0	160	10	
Heavy Vehicles (%)	3%	3%	3%	4%	4%	4%	0%	0%	11%	11%	
Parking (#/hr)											
Turn Type											
Protected Phases	1			1							
Permitted Phases											
Actuated Green, G (s)	69.0			69.0					21.0	21.0	
Effective Green, g (s)	71.0			71.0					23.0	23.0	
Actuated g/C Ratio	0.71			0.71					0.23	0.23	
Clearance Time (s)	5.0			5.0					5.0	5.0	
Lane Grp Cap (vph)	2442			3392					337	273	
v/s Ratio Prot	c0.59			0.22					c0.11		
v/s Ratio Perm	0.83			0.32					0.47	0.04	
Uniform Delay, d1	10.3			5.4					33.3	29.9	
Progression Factor	1.00			0.99					1.00	1.00	
Incremental Delay, d2	3.5			0.2					4.7	0.3	
Delay (s)	13.8			5.6					38.0	30.1	
Level of Service	B			A					D	C	
Approach Delay (s)	13.8			5.6					37.5		
Approach LOS	B			A					D		
Intersection Summary											
HCM Average Control Delay	12.2			12.2					B		
HCM Volume to Capacity ratio	0.75			0.75							
Actuated Cycle Length (s)	100.0			100.0					6.0		
Intersection Capacity Utilization	78.4%			78.4%					D		
Analysis Period (min)	15			15							
c Critical Lane Group											

HCM Signalized Intersection Capacity Analysis  
 16: Denny Way & Broad St  
 2005 Existing Conditions - AM Peak  
 500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NER	NWL	NWR	
Lane Configurations	11	11	11	11	11	11	11	11	11	11	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Flt Protected	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Flt Permitted	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Satd. Flow (prot)	3358	3358	3358	3358	3358	3358	3358	3358	3358	3358	
Flt Permitted	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Satd. Flow (perm)	3358	3358	3358	3358	3358	3358	3358	3358	3358	3358	
Volume (vph)	0	955	5	5	880	5	0	290	35	0	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Adj. Flow (vph)	0	1005	5	5	926	5	0	305	37	0	
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	
Lane Group Flow (vph)	0	1010	0	0	936	0	0	333	0	0	
Heavy Vehicles (%)	3%	3%	3%	4%	4%	4%	5%	5%	5%	2%	
Bus Blockages (#/hr)	0	4	0	0	10	0	0	0	0	0	
Turn Type											
Protected Phases	1			1							
Permitted Phases											
Actuated Green, G (s)	53.0			53.0				37.0	37.0	37.0	
Effective Green, g (s)	55.0			55.0				39.0	39.0	39.0	
Actuated g/C Ratio	0.55			0.55				0.39	0.39	0.39	
Clearance Time (s)	5.0			5.0				5.0	5.0	5.0	
Lane Grp Cap (vph)	1847			1717				1221	1288	531	
v/s Ratio Prot	c0.30			0.30				0.11	0.17		
v/s Ratio Perm	0.55			0.54				0.27	0.43	0.81	
Uniform Delay, d1	14.5			14.5				20.8	22.4	27.2	
Progression Factor	0.49			0.82				1.00	1.00	1.00	
Incremental Delay, d2	0.6			1.2				0.6	1.1	12.7	
Delay (s)	7.8			13.0				21.4	23.5	39.9	
Level of Service	A			B				C	C	D	
Approach Delay (s)	7.8			13.0				21.4			
Approach LOS	A			B				C			
Intersection Summary											
HCM Average Control Delay	18.0			18.0				B			
HCM Volume to Capacity ratio	0.66			0.66							
Actuated Cycle Length (s)	100.0			100.0				6.0			
Intersection Capacity Utilization	62.2%			62.2%				B			
Analysis Period (min)	15			15							
c Critical Lane Group											





HCM Signalized Intersection Capacity Analysis  
 18: Denny Way & Aurora Ave

HCM Signalized Intersection Capacity Analysis  
 18: Denny Way & Aurora Ave

2005 Existing Conditions - AM Peak  
 500 Fifth Avenue North

2005 Existing Conditions - AM Peak  
 500 Fifth Avenue North

Movement	EBT	EBR	EBR2	WBT	WBR	NBT	NBR	NBR2	SBL2	SBL	SBT	SBR
Lane Configurations	11	12	12	11	12	12	12	12	12	12	12	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	11	12	12	12	12	12	12	12	12
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Fit	0.98	0.98	0.98	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Fit Protected	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	3018	3018	3018	2948	2948	3096	3096	3096	1577	1319	1341	1341
Fit Permitted	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	3018	3018	3018	2948	2948	3096	3096	3096	1577	1319	1341	1341
Volume (vph)	810	120	5	720	135	260	55	5	260	115	0	785
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	853	126	5	758	142	274	58	5	274	121	0	826
RTOR Reduction (vph)	0	0	0	13	0	0	0	0	0	0	0	2
Lane Group Flow (vph)	984	0	0	887	0	337	0	0	395	421	419	0
Heavy Vehicles (%)	2%	2%	2%	4%	4%	2%	2%	2%	3%	3%	3%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	4	0
Turn Type	2	2	2	2	2	4	4	4	3	3	8	8
Protected Phases												
Permitted Phases												
Actuated Green, G (s)	37.0	37.0	37.0	15.7	15.7	28.3	49.0	49.0	28.3	49.0	49.0	49.0
Effective Green, g (s)	43.0	43.0	43.0	17.7	17.7	30.3	51.0	51.0	30.3	51.0	51.0	51.0
Actuated g/C Ratio	0.43	0.43	0.43	0.18	0.18	0.30	0.51	0.51	0.30	0.51	0.51	0.51
Clearance Time (s)	9.0	9.0	9.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1298	1298	1298	548	548	478	673	684	478	673	684	684
v/s Ratio Prot	c0.33	c0.33	c0.33	0.11	0.11	c0.25	c0.32	0.31	c0.25	c0.32	0.31	0.31
v/s Ratio Perm	0.76	0.76	0.76	0.61	0.61	0.83	0.63	0.61	0.83	0.63	0.61	0.61
Uniform Delay, d1	24.1	24.1	24.1	38.0	38.0	32.4	17.6	17.5	32.4	17.6	17.5	17.5
Progression Factor	1.23	1.23	1.23	0.65	0.65	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	4.0	4.0	4.0	3.0	3.0	2.1	1.8	1.6	2.1	1.8	1.6	1.6
Delay (s)	33.6	33.6	33.6	18.0	18.0	40.1	19.5	19.1	40.1	19.5	19.1	19.1
Level of Service	C	C	C	B	B	D	D	B	D	D	B	B
Approach Delay (s)	33.6	33.6	33.6	18.0	18.0	40.1	19.5	19.1	40.1	19.5	19.1	19.1
Approach LOS	C	C	C	B	B	D	D	B	D	D	B	B
Intersection Summary												
HCM Average Control Delay	27.8	27.8	27.8	HCM Level of Service	C							
HCM Volume to Capacity ratio	0.75	0.75	0.75									
Actuated Cycle Length (s)	100.0	100.0	100.0	Sum of lost time (s)	6.0							
Intersection Capacity Utilization	72.7%	72.7%	72.7%	ICU Level of Service	C							
Analysis Period (min)	15	15	15									
c Critical Lane Group												

Movement	EBT	EBR	EBR2	WBT	WBR	NBT	NBR	NBR2	SBL2	SBL	SBT	SBR
Lane Configurations	11	12	12	11	12	12	12	12	12	12	12	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	11	12	12	12	12	12	12	12	12
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Fit	0.98	0.98	0.98	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Fit Protected	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	3018	3018	3018	2948	2948	3096	3096	3096	1577	1319	1341	1341
Fit Permitted	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	3018	3018	3018	2948	2948	3096	3096	3096	1577	1319	1341	1341
Volume (vph)	810	120	5	720	135	260	55	5	260	115	0	785
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	853	126	5	758	142	274	58	5	274	121	0	826
RTOR Reduction (vph)	0	0	0	13	0	0	0	0	0	0	0	2
Lane Group Flow (vph)	984	0	0	887	0	337	0	0	395	421	419	0
Heavy Vehicles (%)	2%	2%	2%	4%	4%	2%	2%	2%	3%	3%	3%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	4	0
Turn Type	2	2	2	2	2	4	4	4	3	3	8	8
Protected Phases												
Permitted Phases												
Actuated Green, G (s)	37.0	37.0	37.0	15.7	15.7	28.3	49.0	49.0	28.3	49.0	49.0	49.0
Effective Green, g (s)	43.0	43.0	43.0	17.7	17.7	30.3	51.0	51.0	30.3	51.0	51.0	51.0
Actuated g/C Ratio	0.43	0.43	0.43	0.18	0.18	0.30	0.51	0.51	0.30	0.51	0.51	0.51
Clearance Time (s)	9.0	9.0	9.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1298	1298	1298	548	548	478	673	684	478	673	684	684
v/s Ratio Prot	c0.33	c0.33	c0.33	0.11	0.11	c0.25	c0.32	0.31	c0.25	c0.32	0.31	0.31
v/s Ratio Perm	0.76	0.76	0.76	0.61	0.61	0.83	0.63	0.61	0.83	0.63	0.61	0.61
Uniform Delay, d1	24.1	24.1	24.1	38.0	38.0	32.4	17.6	17.5	32.4	17.6	17.5	17.5
Progression Factor	1.23	1.23	1.23	0.65	0.65	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	4.0	4.0	4.0	3.0	3.0	2.1	1.8	1.6	2.1	1.8	1.6	1.6
Delay (s)	33.6	33.6	33.6	18.0	18.0	40.1	19.5	19.1	40.1	19.5	19.1	19.1
Level of Service	C	C	C	B	B	D	D	B	D	D	B	B
Approach Delay (s)	33.6	33.6	33.6	18.0	18.0	40.1	19.5	19.1	40.1	19.5	19.1	19.1
Approach LOS	C	C	C	B	B	D	D	B	D	D	B	B
Intersection Summary												
HCM Average Control Delay	27.8	27.8	27.8	HCM Level of Service	C							
HCM Volume to Capacity ratio	0.75	0.75	0.75									
Actuated Cycle Length (s)	100.0	100.0	100.0	Sum of lost time (s)	6.0							
Intersection Capacity Utilization	72.7%	72.7%	72.7%	ICU Level of Service	C							
Analysis Period (min)	15	15	15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis  
 19: Denny Way & Dexter Avenue  
 2005 Existing Conditions - AM Peak  
 500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4T	4T		4T	4T		4T	4T		4T	4T	4T
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0			3.0			3.0	3.0		3.0		3.0
Lane Util. Factor	0.95			0.95			1.00	0.95		1.00		0.95
Frt	1.00			0.99			1.00	0.99		1.00		0.85
Frt Protected	1.00			1.00			0.95	1.00		0.95		1.00
Satd. Flow (prot)	3215			3143			1354	2673		1593		3185
Flt Permitted	1.00			1.00			0.43	1.00		0.72		1.00
Satd. Flow (perm)	3215			3143			611	2673		1201		3185
Volume (vph)	0	1045	5	0	715	70	5	50	5	140	290	160
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	1136	5	0	777	76	5	54	5	152	315	174
RTOR Reduction (vph)	0	0	0	0	0	0	0	4	0	0	0	0
Lane Group Flow (vph)	0	1141	0	0	848	0	5	55	0	152	315	37
Heavy Vehicles (%)	1%	1%	1%	2%	2%	2%	20%	20%	20%	2%	2%	2%
Turn Type	pm+pt						Perm			Perm		Perm
Protected Phases	2	5			1			3			3	
Permitted Phases	5						3			3		3
Actuated Green, G (s)	69.8			58.2			18.2	18.2		18.2		18.2
Effective Green, g (s)	72.8			61.2			21.2	21.2		21.2		21.2
Actuated g/C Ratio	0.73			0.61			0.21	0.21		0.21		0.21
Clearance Time (s)	6.0			6.0			6.0	6.0		6.0		6.0
Vehicle Extension (s)	3.0			3.0			3.0	3.0		3.0		3.0
Lane Grp Cap (vph)	2341			1924			130	567		255		302
v/s Ratio Prot	c0.35			0.27				0.02				0.10
v/s Ratio Perm							0.01			c0.13		0.03
v/c Ratio	0.49			0.44			0.04	0.10		0.60		0.12
Uniform Delay, d1	5.7			10.3			31.3	31.7		35.5		34.5
Progression Factor	0.56			1.00			1.00	1.00		1.00		1.00
Incremental Delay, d2	0.1			0.7			0.1	0.5		3.7		0.2
Delay (s)	3.3			11.0			31.4	31.8		39.3		32.1
Level of Service	A			B			C	C		D		C
Approach Delay (s)	3.3			11.0				31.7				35.2
Approach LOS	A			B				C				D
Intersection Summary												
HCM Average Control Delay	14.0											
HCM Volume to Capacity ratio	0.51											
Actuated Cycle Length (s)	100.0											
Intersection Capacity Utilization	54.2%											
Analysis Period (min)	15											
Critical Lane Group	B											
	6.0											
	A											

HCM Signalized Intersection Capacity Analysis  
 20: Denny Way & Westlake Ave  
 2005 Existing Conditions - AM Peak  
 500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	4T1A												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width	12	11	12	12	11	12	12	11	12	12	12	12	
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.96	0.96	0.96	0.96	0.96	0.96	
Fit	1.00	1.00	1.00	0.98	0.98	0.98	1.00	1.00	1.00	1.00	1.00	1.00	
Fit Protected	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Satd. Flow (prot)	3079	3079	2957	2957	2957	2957	5087	5087	5087	5087	5087	5087	
Fit Permitted	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Satd. Flow (perm)	3079	3079	2957	2957	2957	2957	5087	5087	5087	5087	5087	5087	
Volume (vph)	0	1315	0	0	780	125	5	150	60	0	0	0	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	
Adj. Flow (vph)	0	1370	0	0	812	130	5	156	62	0	0	0	
RTOR Reduction (vph)	0	0	0	0	6	0	0	55	0	0	0	0	
Lane Group Flow (vph)	0	1370	0	0	936	0	0	168	0	0	0	0	
Heavy Vehicles (%)	2%	2%	2%	4%	4%	4%	7%	7%	7%	0%	0%	0%	
Turn Type	Perm												
Protected Phases	1	1											
Permitted Phases	2											2	
Actuated Green, G (s)	80.9	80.9											9.1
Effective Green, g (s)	82.9	82.9											11.1
Actuated g/C Ratio	0.83	0.83											0.11
Clearance Time (s)	5.0	5.0											5.0
Vehicle Extension (s)	3.0	3.0											3.0
Lane Grp Cap (vph)	2552	2451											565
v/s Ratio Prot	c0.44	0.32											
v/s Ratio Perm													
v/c Ratio	0.54	0.38											0.03
Uniform Delay, d1	2.6	2.1											40.9
Progression Factor	1.00	1.00											1.18
Incremental Delay, d2	0.8	0.5											0.3
Delay (s)	3.4	2.6											48.4
Level of Service	A	A											D
Approach Delay (s)	3.4	2.6											48.4
Approach LOS	A	A											D
Intersection Summary													
HCM Average Control Delay	7.1											HCM Level of Service	A
HCM Volume to Capacity ratio	0.51												
Actuated Cycle Length (s)	100.0											Sum of lost time (s)	6.0
Intersection Capacity Utilization	52.9%											ICU Level of Service	A
Analysis Period (min)	15												
Critical Lane Group													

HCM Signalized Intersection Capacity Analysis  
21: Denny Way & Fairview Ave

2005 Existing Conditions - AM Peak

500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↶	↷		↶	↷		↶	↷		↶	↷	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	12	11	11	12	9	10	12	10	10	12
Total Lost time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		0.97	0.95		1.00	0.95	
Fit Protected	1.00	1.00		1.00	0.99		1.00	0.97		1.00	0.95	
Fit Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1555	3097		1540	3045		2781	2878		1458	2776	
Fit Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1555	3097		1540	3045		2781	2878		1458	2776	
Volume (vph)	75	725	20	35	630	50	320	205	55	80	275	130
Peak-hour factor, PHF	0.94	0.94		0.94	0.94		0.94	0.94		0.94	0.94	
Adj. Flow (vph)	80	771	21	37	670	53	340	218	59	85	293	138
RTOR Reduction (vph)	0	2	0	0	5	0	0	26	0	0	60	0
Lane Group Flow (vph)	80	790	0	37	718	0	340	251	0	85	371	0
Heavy Vehicles (%)	1%	1%	1%	2%	2%	2%	2%	2%	2%	4%	4%	4%
Turn Type	Prot	Prot		Prot	Prot		Prot	Prot		Prot	Prot	
Protected Phases	1	6		5	2		3	8		7	4	
Permitted Phases												
Actuated Green, G (s)	8.1	41.6		5.2	38.7		14.4	26.0		7.2	18.8	
Effective Green, g (s)	10.1	43.6		7.2	40.7		16.4	28.0		9.2	20.8	
Actuated g/C Ratio	0.10	0.44		0.07	0.41		0.16	0.28		0.09	0.21	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	157	1350		111	1239		456	806		134	577	
v/s Ratio Prot	c0.05	c0.26		0.02	0.24		c0.12	0.09		0.06	c0.13	
v/s Ratio Perm												
v/c Ratio	0.51	0.59		0.33	0.58		0.75	0.31		0.63	0.64	
Uniform Delay, d1	42.6	21.4		44.1	23.0		39.8	28.4		43.8	36.2	
Progression Factor	1.00	1.00		1.26	0.77		1.00	1.00		1.14	0.75	
Incremental Delay, d2	2.6	1.9		1.1	1.3		6.5	0.2		8.1	2.1	
Delay (s)	45.2	23.2		56.7	18.9		46.3	28.6		58.1	29.1	
Level of Service	D	C		E	B		D	C		E	C	
Approach Delay (s)	25.2			20.7			38.4			33.9		
Approach LOS	C			C			D			C		
Intersection Summary												
HCM Average Control Delay	28.5											
HCM Volume to Capacity ratio	0.63											
Actuated Cycle Length (s)	100.0											
Intersection Capacity Utilization	63.7%											
Analysis Period (min)	15											
Critical Lane Group												

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Synchro 6 Report  
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2005 Existing Conditions - AM Peak

500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑↑			↑			4↑↑					
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0			3.0	3.0					3.0		
Lane Util. Factor	0.95			1.00	1.00					0.86		
Fit	0.95			1.00	1.00					0.99		
Fit Protected	1.00			0.95	1.00					1.00		
Satd. Flow (prot)	2972			1593	1676					5541		
Fit Permitted	1.00			0.95	1.00					1.00		
Satd. Flow (perm)	2972			1593	1676					5541		
Volume (vph)	0	460	220	475	665	0	0	0	0	180	1715	85
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	479	229	495	693	0	0	0	0	188	1786	89
RTOR Reduction (vph)	0	47	0	0	0	0	0	0	0	0	6	0
Lane Group Flow (vph)	0	661	0	495	693	0	0	0	0	0	2057	0
Heavy Vehicles (%)	4%	4%	4%	2%	2%	2%	0%	0%	0%	5%	5%	5%
Turn Type	Prot			Prot			Split			Split		
Protected Phases	3			2 2 3			1			1		
Permitted Phases												
Actuated Green, G (s)	20.5			29.5 54.5			36.5					
Effective Green, g (s)	22.0			31.0 56.0			38.0					
Actuated g/C Ratio	0.22			0.31 0.56			0.38					
Clearance Time (s)	4.5			4.5			4.5					
Vehicle Extension (s)	3.0			3.0			3.0					
Lane Grp Cap (vph)	554			494 939			2106					
v/s Ratio Prot	c0.22			c0.31 0.41			c0.37					
v/s Ratio Perm												
v/c Ratio	1.01			1.00 0.74			0.98					
Uniform Delay, d1	39.0			34.5 16.5			30.6					
Progression Factor	0.87			1.00 1.00			0.81					
Incremental Delay, d2	37.0			41.0 3.1			12.8					
Delay (s)	71.0			75.5 19.6			37.7					
Level of Service	E			E B			D					
Approach Delay (s)	71.0			42.9			0.0			37.7		
Approach LOS	E			D			A			D		
Intersection Summary												
HCM Average Control Delay	45.2 HCM Level of Service											
HCM Volume to Capacity ratio	0.99											
Actuated Cycle Length (s)	100.0											
Intersection Capacity Utilization	93.4%											
Analysis Period (min)	15											
Critical Lane Group												

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Synchro 6 Report  
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HCM Signalized Intersection Capacity Analysis  
23: Yale St & Stewart St

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HCM Signalized Intersection Capacity Analysis  
24: Yale St & Howell St  
2005 Existing Conditions - AM Peak  
500 Fifth Avenue North

Movement		SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations		1	1	1	1	1	1	1	1	1	1	1	1
Ideal Flow (vphpt)		1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.0	3.0						3.0	3.0		3.0	
Lane Util. Factor		1.00	1.00						0.95	1.00		1.00	
Frt		1.00	0.99						1.00	0.85		1.00	
Frt Protected		0.95	1.00						0.99	1.00		1.00	
Satd. Flow (prot)		1593	1334						2779	1253		1690	
Frt Permitted		0.95	1.00						0.81	1.00		1.00	
Satd. Flow (pern)		1593	1334						2266	1253		1690	
Volume (vph)		15	665	25	0	0	0	35	185	370	0	350	5
Peak-hour factor, PHF		0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)		17	773	29	0	0	0	41	215	430	0	407	6
RTOR Reduction (vph)		0	1	0	0	0	0	0	0	106	0	1	0
Lane Group Flow (vph)		17	801	0	0	0	0	0	256	324	0	412	0
Heavy Vehicles (%)		2%	2%	2%	0%	0%	0%	16%	16%	16%	1%	1%	1%
Parking (#/hr)		20											
Turn Type	Split	2	2					Pern	1	1		1	
Protected Phases													
Permitted Phases								1					
Actuated Green, G (s)		53.0	53.0						37.0	37.0		37.0	
Effective Green, g (s)		55.0	55.0						39.0	39.0		39.0	
Actuated g/C Ratio		0.55	0.55						0.39	0.39		0.39	
Clearance Time (s)		5.0	5.0						5.0	5.0		5.0	
Vehicle Extension (s)		3.0	3.0						3.0	3.0		3.0	
Lane Grp Cap (vph)		876	734						884	489		659	
v/s Ratio Prot		0.01	c0.60						c0.26	0.24			
v/s Ratio Pern									0.11				
v/c Ratio		0.02	1.09						0.29	0.66		0.63	
Uniform Delay, d1		10.2	22.5						21.0	25.1		24.6	
Progression Factor		0.63	0.73						1.00	1.00		1.00	
Incremental Delay, d2		0.0	59.5						0.8	6.9		4.4	
Delay (s)		6.4	75.8						21.8	32.0		29.1	
Level of Service		A	E						C	C		C	
Approach Delay (s)		74.4			0.0				28.2			29.1	
Approach LOS		E			A				C			C	
Intersection Summary													
HCM Average Control Delay		48.1			HCM Level of Service							D	
HCM Volume to Capacity ratio		0.91											
Actuated Cycle Length (s)		100.0			Sum of lost time (s)							6.0	
Intersection Capacity Utilization		81.2%			ICU Level of Service							D	
Analysis Period (min)		15											
Critical Lane Group													

HCM Signalized Intersection Capacity Analysis 2005 Existing Conditions - PM Peak Hour  
1: Roy St & 5th Ave 500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	12	12	12	12	12	12	12	12	12	12	12	12
Lane Width	11	12	11	11	11	11	11	11	11	11	11	12
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	1.00	0.95	0.95	1.00	0.99	1.00	1.00	0.99	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt	0.99	1.00	0.98	1.00	0.98	1.00	0.98	1.00	0.98	1.00	0.98	1.00
Flt Protected	0.98	1.00	0.95	0.99	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1381	1381	1641	1437	1641	1437	1641	1437	1641	1437	1641	1415
Flt Permitted	0.98	0.95	0.95	0.99	0.95	1.00	0.95	0.99	0.95	1.00	0.95	1.00
Satd. Flow (perm)	1381	1641	1437	1641	1437	1641	1437	1641	1437	1641	1437	1415
Volume (vph)	0	0	0	35	55	5	540	310	45	10	180	65
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	38	60	5	587	337	49	11	196	71
RTOR Reduction (vph)	0	0	0	2	0	0	0	6	0	0	16	0
Lane Group Flow (vph)	0	0	0	101	0	515	452	0	11	251	0	0
Conf. Peds. (#/hr)	20	20	20	20	20	20	20	20	20	20	20	20
Heavy Vehicles (%)	0%	0%	0%	2%	2%	2%	1%	1%	1%	6%	6%	6%
Parking (#/hr)	0	0	0	20	20	20	1%	1%	1%	6%	6%	6%
Turn Type	Perm	Perm	Perm	Split	Split	Split	Split	Split	Split	Split	Split	Split
Protected Phases	6	6	6	4	4	4	4	4	4	4	4	4
Permitted Phases	6	6	6	4	4	4	4	4	4	4	4	4
Actuated Green, G (s)	17.0	17.0	27.0	27.0	27.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0
Effective Green, g (s)	20.0	20.0	30.0	30.0	30.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0
Actuated g/C Ratio	0.25	0.25	0.38	0.38	0.38	0.26	0.26	0.26	0.26	0.26	0.26	0.26
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lane Grp Cap (vph)	345	345	615	539	432	371	432	371	432	371	432	371
v/s Ratio Prot	0.07	0.07	0.31	c0.31	0.01	c0.18	0.01	c0.18	0.01	c0.18	0.01	c0.18
v/c Ratio	0.29	0.29	0.84	0.84	0.03	0.68	0.03	0.68	0.03	0.68	0.03	0.68
Uniform Delay, d1	24.3	24.3	22.8	22.8	21.9	26.4	21.9	26.4	21.9	26.4	21.9	26.4
Progression Factor	0.99	0.99	0.21	0.21	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.1	2.1	7.7	8.8	0.1	9.5	0.1	9.5	0.1	9.5	0.1	9.5
Delay (s)	26.2	26.2	12.4	13.5	22.0	36.0	22.0	36.0	22.0	36.0	22.0	36.0
Level of Service	C	C	B	B	B	C	B	C	B	C	B	C
Approach Delay (s)	0.0	0.0	26.2	12.9	35.4	35.4	35.4	35.4	35.4	35.4	35.4	35.4
Approach LOS	A	A	C	B	D	D	D	D	D	D	D	D
Intersection Summary												
HCM Average Control Delay	18.6											
HCM Volume to Capacity ratio	0.64											
Actuated Cycle Length (s)	80.0											
Intersection Capacity Utilization	59.3%											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis 2005 Existing Conditions - PM Peak Hour  
2: Broad St & 9th Ave 500 Fifth Avenue North

Movement	EBT	EBR	WBL	WBT	WBR	SBL	SBT	SBR	SBR2
Lane Configurations	4P		1	4P		4P	4P	4	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	10	10	11	12	9	8	12
Total Lost time (s)	3.0		3.0	3.0		3.0	3.0	3.0	
Lane Util. Factor	0.95		1.00	0.95		1.00	0.91	1.00	
Frpb, ped/bikes	1.00		1.00	1.00		1.00	1.00	1.00	
Flpb, ped/bikes	1.00		0.99	1.00		1.00	1.00	1.00	
Flt	0.93		1.00	0.99		1.00	0.85	1.00	0.85
Flt Protected	1.00		0.95	1.00		0.99	1.00		
Satd. Flow (prot)	2928		1505	2999		3847	1247		
Flt Permitted	1.00		0.30	1.00		0.99	1.00		
Satd. Flow (perm)	2928		468	2999		3847	1247		
Volume (vph)	315	260	85	1510	120	135	875	190	5
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	325	268	88	1557	124	139	902	196	5
RTOR Reduction (vph)	120	0	0	0	0	0	0	1	0
Lane Group Flow (vph)	473	0	88	1681	0	0	1041	200	0
Conf. Peds. (#/hr)			50			50			
Heavy Vehicles (%)	0%	0%	0%	0%	0%	1%	1%	1%	1%
Bus Blockages (#/hr)	0	0	0	0	0	0	2	0	0
Parking (#/hr)							20		
Turn Type	1		pm+pt	1	2	3	3	3	3
Protected Phases		1							
Permitted Phases		12							
Actuated Green, G (s)	39.7	64.6	70.6				37.4	37.4	
Effective Green, g (s)	42.7	70.6	73.6				40.4	40.4	
Actuated g/C Ratio	0.36	0.59	0.61				0.34	0.34	
Clearance Time (s)	6.0	6.0	6.0				6.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0				3.0	3.0	
Lane Grp Cap (vph)	1042	516	1839				1295	420	
v/s Ratio Prot	0.16	0.04	c0.56				c0.27	0.16	
v/c Ratio Perm		0.06							
v/c Ratio	0.45	0.17	0.91				0.80	0.48	
Uniform Delay, d1	29.7	18.8	20.4				36.2	31.5	
Progression Factor	1.00	0.63	0.71				1.00	1.00	
Incremental Delay, d2	1.4	0.1	6.5				3.7	0.9	
Delay (s)	31.1	12.0	21.0				39.9	32.3	
Level of Service	C	B	C				D	C	
Approach Delay (s)	31.1		20.5				38.7		
Approach LOS	C		C				D		
Intersection Summary									
HCM Average Control Delay	28.5								
HCM Volume to Capacity ratio	0.87								
Actuated Cycle Length (s)	120.0								
Intersection Capacity Utilization	79.1%								
Analysis Period (min)	15								
Critical Lane Group									



HCM Signalized Intersection Capacity Analysis 2005 Existing Conditions - PM Peak Hour  
3: Broad St & Westlake Ave 500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4↑	4↑	4↑	4↑	4↑	4↑	4↑	4↑	4↑	4↑	4↑	4↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	12	12	10	12	12	10	12	12	12	12
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	0.91	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fipb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fit Protected	1.00	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00
Satd. Flow (prot)	3104	3104	3104	4357	1454	1448	3002	1439	3002	1439	3002	1439
Fit Permitted	0.86	1.00	1.00	1.00	0.95	1.00	1.00	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	2670	4357	1454	1448	3002	1439	3002	1439	3002	1439	3002	1439
Volume (vph)	15	420	0	0	1600	1005	125	495	290	0	0	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	16	442	0	0	1684	1058	132	521	305	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	18	0	0	231	0	0	0
Lane Group Flow (vph)	0	458	0	0	1684	1040	132	521	74	0	0	0
Confl. Peds. (#/hr)	50	50	50	50	50	50	50	50	50	50	50	50
Heavy Vehicles (%)	1%	1%	1%	0%	0%	0%	1%	1%	1%	0%	0%	0%
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	2	2	2	2	2	2	2	2	2	2	2	2
Permitted Phases	2	2	2	2	2	2	2	2	2	2	2	2
Actuated Green, G (s)	82.5	82.5	82.5	82.5	82.5	82.5	82.5	82.5	82.5	82.5	82.5	82.5
Effective Green, g (s)	85.0	85.0	85.0	85.0	85.0	85.0	85.0	85.0	85.0	85.0	85.0	85.0
Actuated g/C Ratio	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71
Clearance Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1891	3086	1030	350	725	348	725	348	725	348	725	348
v/s Ratio Prot	0.17	0.39	0.72	0.09	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17
v/s Ratio Perm	0.24	0.55	1.01	0.38	0.72	0.21	0.21	0.21	0.21	0.21	0.21	0.21
Uniform Delay, d1	6.2	8.3	17.5	38.0	41.8	36.4	36.4	36.4	36.4	36.4	36.4	36.4
Progression Factor	0.41	0.86	0.73	0.31	0.34	0.45	0.45	0.45	0.45	0.45	0.45	0.45
Incremental Delay, d2	0.1	0.2	27.2	2.0	4.0	0.9	0.9	0.9	0.9	0.9	0.9	0.9
Delay (s)	2.6	7.3	40.0	13.9	18.2	17.2	17.2	17.2	17.2	17.2	17.2	17.2
Level of Service	A	A	D	B	B	B	B	B	B	B	B	B
Approach Delay (s)	2.6	20.0	20.0	17.3	17.3	17.3	17.3	17.3	17.3	17.3	17.3	17.3
Approach LOS	A	B	B	B	B	B	B	B	B	B	B	B
Intersection Summary												
HCM Average Control Delay	17.4											
HCM Volume to Capacity ratio	0.94											
Actuated Cycle Length (s)	120.0											
Intersection Capacity Utilization	107.7%											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis 2005 Existing Conditions - PM Peak Hour  
4: Valley St & Fairview Ave 500 Fifth Avenue North

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	4↑	4↑	4↑	4↑	4↑	4↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	10	12	12	12	12	12
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	1.00	1.00	1.00	0.95	0.94
Frb	1.00	0.85	1.00	1.00	1.00	0.85
Fipb	1.00	1.00	1.00	1.00	1.00	1.00
Fit Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3002	1151	812	3217	4536	1439
Fit Permitted	1.00	1.00	0.31	1.00	0.95	1.00
Satd. Flow (perm)	3002	1151	267	3217	4536	1439
Volume (vph)	550	50	5	845	1750	295
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	561	51	5	862	1786	301
RTOR Reduction (vph)	0	16	0	0	0	53
Lane Group Flow (vph)	561	35	5	862	1786	248
Heavy Vehicles (%)	1%	1%	100%	1%	1%	1%
Parking (#/hr)	20	20	20	20	20	20
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	4	4	4	4
Permitted Phases	4	4	4	4	4	4
Actuated Green, G (s)	40.0	40.0	40.0	54.0	56.0	70.0
Effective Green, g (s)	42.0	42.0	42.0	56.0	58.0	72.0
Actuated g/C Ratio	0.35	0.35	0.44	0.47	0.48	0.60
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1051	403	168	1501	2192	863
v/s Ratio Prot	0.19	0.00	0.00	0.27	0.39	0.17
v/s Ratio Perm	0.53	0.09	0.03	0.57	0.81	0.29
Uniform Delay, d1	31.2	26.2	19.5	23.3	26.4	11.6
Progression Factor	1.03	1.12	1.00	1.00	0.98	1.01
Incremental Delay, d2	1.9	0.4	0.1	0.5	1.2	0.1
Delay (s)	33.9	29.8	19.5	23.9	27.0	11.8
Level of Service	C	C	B	C	C	B
Approach Delay (s)	33.6	23.8	24.8	23.8	24.8	23.8
Approach LOS	C	C	C	C	C	C
Intersection Summary						
HCM Average Control Delay	26.1					
HCM Volume to Capacity ratio	0.70					
Actuated Cycle Length (s)	120.0					
Intersection Capacity Utilization	69.6%					
Analysis Period (min)	15					
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis 2005 Existing Conditions - PM Peak Hour  
5: Mercer St & 1st Avenue 500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4↑											
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0						3.0	3.0				
Lane Util. Factor	0.95						1.00	0.95				
Frt	1.00						1.00	0.93				
Flt Protected	1.00						0.95	1.00				
Satd. Flow (prot)	3524						1736	3242				
Flt Permitted	1.00						0.95	1.00				
Satd. Flow (perm)	3524						1736	3242				
Volume (vph)	95	1000	0	0	0	0	145	400	315	0	0	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	100	1053	0	0	0	0	153	421	332	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	27	0	0	0	0
Lane Group Flow (vph)	0	1153	0	0	0	0	153	726	0	0	0	0
Heavy Vehicles (%)	2%	2%	2%	0%	0%	0%	4%	4%	4%	0%	0%	0%
Turn Type	Perm	1					Perm	2				
Protected Phases												
Permitted Phases	1						2					
Actuated Green, G (s)	36.0						36.0	36.0				
Effective Green, g (s)	37.0						37.0	37.0				
Actuated g/C Ratio	0.46						0.46	0.46				
Clearance Time (s)	4.0						4.0	4.0				
Lane Grp Cap (vph)	1630						803	1499				
v/s Ratio Prot							c0.22					
v/s Ratio Perm	0.33						0.09					
v/c Ratio	0.71						0.19	0.48				
Uniform Delay, d1	17.2						12.7	14.9				
Progression Factor	1.00						1.00	1.00				
Incremental Delay, d2	2.6						0.5	1.1				
Delay (s)	19.8						13.2	16.0				
Level of Service	B						B	B				
Approach Delay (s)	19.8					0.0		15.5			0.0	
Approach LOS	B					A		B			A	
Intersection Summary												
HCM Average Control Delay	17.9						HCM Level of Service					
HCM Volume to Capacity ratio	0.60						B					
Actuated Cycle Length (s)	80.0						Sum of lost time (s)					
Intersection Capacity Utilization	58.2%						6.0					
Analysis Period (min)	15						B					
Critical Lane Group												

HCM Signalized Intersection Capacity Analysis 2005 Existing Conditions - PM Peak Hour  
6: Mercer St & 5th Ave 500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4TH											
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	11	12	12	12	12	11	11	11	11	12
Total Lost time (s)	3.0	3.0	3.0				3.0	3.0	3.0	3.0	3.0	
Lane Util. Factor	0.86	1.00					0.91	0.91	0.91	0.91	0.91	
Frpb, ped/bikes	1.00	0.92					1.00	0.95	1.00	1.00	1.00	
Flpb, ped/bikes	1.00	0.85					1.00	0.85	1.00	1.00	1.00	
Flt Protected	1.00	1.00					1.00	1.00	0.95	0.99		
Satd. Flow (prot)	5871	1421					3190	1335	1527	2843		
Flt Permitted	1.00	1.00					1.00	1.00	0.13	0.73		
Satd. Flow (perm)	5871	1421					3190	1335	212	2114		
Volume (vph)	60	1135	160	0	0	0	885	305	110	145	0	0
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	64	1207	170	0	0	0	941	324	117	154	0	0
RTOR Reduction (vph)	0	0	62	0	0	0	0	0	178	0	0	0
Lane Group Flow (vph)	0	1271	108	0	0	0	941	146	59	212	0	0
Conf. Peds. (#/hr)	30		35	35			30	95	25	25	95	95
Heavy Vehicles (%)	1%	1%	1%	0%	0%	0%	1%	1%	1%	4%	4%	4%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	18	0	0	18	0
Parking (#/hr)	25	25									8	
Turn Type	Perm	2	Perm				Perm	pm+pt				
Protected Phases	2						8		7	4		
Permitted Phases	2		2					8	4			
Actuated Green, G (s)	22.0		22.0				26.0	26.0	46.0	46.0		
Effective Green, g (s)	25.0		25.0				29.0	29.0	49.0	49.0		
Actuated g/C Ratio	0.31		0.31				0.36	0.36	0.61	0.61		
Clearance Time (s)	6.0		6.0				6.0	6.0	6.0	6.0		
Lane Grp Cap (vph)	1835		444				1156	484	409	1450		
v/s Ratio Prot							c0.29		0.03	c0.03		
v/s Ratio Perm	0.22		0.08					0.11	0.06	0.06		
v/c Ratio	0.69		0.24				0.81	0.30	0.14	0.15		
Uniform Delay, d1	24.1		20.5				23.1	18.3	16.9	6.6		
Progression Factor	0.76		0.51				0.83	0.77	2.66	2.84		
Incremental Delay, d2	1.7		1.0				6.0	1.5	0.6	0.2		
Delay (s)	20.1		11.4				25.2	15.6	45.4	18.9		
Level of Service	C		B				C	B	D	B		
Approach Delay (s)	19.1					0.0		22.7		24.7		
Approach LOS	B					A		C		C		
Intersection Summary												
HCM Average Control Delay	21.2						HCM Level of Service					
HCM Volume to Capacity ratio	0.59						C					
Actuated Cycle Length (s)	80.0						Sum of lost time (s)					
Intersection Capacity Utilization	69.5%						6.0					
Analysis Period (min)	15						C					
Critical Lane Group												

HCM Signalized Intersection Capacity Analysis 2005 Existing Conditions - PM Peak Hour  
7: Mercer St & Dexter Avenue 500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBR	NBT	NBR	SBT	NEL	NER	NER2
Lane Configurations	4T1P	4T1P	4T1P	4T1P	4T1P	4T1P	4T1P	4T1P	4T1P	4T1P
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Flt	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Satd. Flow (prot)	5762	5762	5762	5762	5762	5762	5762	5762	5762	5762
Flt Permitted	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Satd. Flow (perm)	5762	5762	5762	5762	5762	5762	5762	5762	5762	5762
Volume (vph)	240	1405	40	80	380	125	275	420	25	305
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	270	1579	45	90	427	140	309	472	28	343
RTOR Reduction (vph)	0	0	0	47	0	20	0	0	0	2
Lane Group Flow (vph)	0	1894	0	43	427	120	309	472	205	175
Heavy Vehicles (%)	1%	1%	1%	0%	0%	0%	0%	1%	0%	0%
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	1	1	1	1	1	1	1	1	1	1
Permitted Phases	1	1	1	1	1	1	1	1	1	1
Actuated Green, G (s)	64.0	64.0	64.0	64.0	64.0	64.0	64.0	64.0	64.0	64.0
Effective Green, g (s)	67.0	67.0	67.0	67.0	67.0	67.0	67.0	67.0	67.0	67.0
Actuated g/C Ratio	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lane Grp Cap (vph)	2758	2758	2758	2758	2758	2758	2758	2758	2758	2758
v/s Ratio Prot	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
v/s Ratio Perm	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Uniform Delay, d1	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4
Delay (s)	29.8	29.8	29.8	29.8	29.8	29.8	29.8	29.8	29.8	29.8
Level of Service	C	C	C	C	C	C	C	C	C	C
Approach Delay (s)	29.8	29.8	29.8	29.8	29.8	29.8	29.8	29.8	29.8	29.8
Approach LOS	C	C	C	C	C	C	C	C	C	C
Intersection Summary										
HCM Average Control Delay	59.6	59.6	59.6	59.6	59.6	59.6	59.6	59.6	59.6	59.6
HCM Volume to Capacity ratio	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Actuated Cycle Length (s)	140.0	140.0	140.0	140.0	140.0	140.0	140.0	140.0	140.0	140.0
Intersection Capacity Utilization	83.8%	83.8%	83.8%	83.8%	83.8%	83.8%	83.8%	83.8%	83.8%	83.8%
Analysis Period (min)	15	15	15	15	15	15	15	15	15	15
c Critical Lane Group										

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HCM Signalized Intersection Capacity Analysis 2005 Existing Conditions - PM Peak Hour  
8: Mercer St & 9th Ave 500 Fifth Avenue North

Movement	EBT	EBR	SBT	SEB	SEB
Lane Configurations	4T1P	4T1P	4T1P	4T1P	4T1P
Ideal Flow (vphpl)	1900	1900	1900	1900	1900
Lane Width	11	12	12	9	12
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.86	0.86	0.86	0.86	0.86
Flt	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.99	0.99	0.99	0.99	0.99
Satd. Flow (prot)	5621	5621	5621	5621	5621
Flt Permitted	0.99	0.99	0.99	0.99	0.99
Satd. Flow (perm)	5621	5621	5621	5621	5621
Volume (vph)	1820	20	900	255	80
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	1857	20	918	260	82
RTOR Reduction (vph)	1	0	8	8	0
Lane Group Flow (vph)	1876	0	451	793	0
Heavy Vehicles (%)	1%	1%	1%	1%	1%
Bus Blockages (#/hr)	0	0	0	2	0
Turn Type	Perm	Perm	Perm	Perm	Perm
Protected Phases	1	1	1	1	1
Permitted Phases	1	1	1	1	1
Actuated Green, G (s)	66.5	66.5	66.5	66.5	66.5
Effective Green, g (s)	69.0	69.0	69.0	69.0	69.0
Actuated g/C Ratio	0.57	0.57	0.57	0.57	0.57
Clearance Time (s)	5.5	5.5	5.5	5.5	5.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	3232	3232	3232	3232	3232
v/s Ratio Prot	0.33	0.33	0.33	0.33	0.33
v/s Ratio Perm	0.33	0.33	0.33	0.33	0.33
Uniform Delay, d1	16.3	16.3	16.3	16.3	16.3
Progression Factor	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.8	0.8	0.8	0.8	0.8
Delay (s)	17.0	17.0	17.0	17.0	17.0
Level of Service	B	B	B	B	B
Approach Delay (s)	17.0	17.0	17.0	17.0	17.0
Approach LOS	B	B	B	B	B
Intersection Summary					
HCM Average Control Delay	33.3	33.3	33.3	33.3	33.3
HCM Volume to Capacity ratio	0.72	0.72	0.72	0.72	0.72
Actuated Cycle Length (s)	120.0	120.0	120.0	120.0	120.0
Intersection Capacity Utilization	64.0%	64.0%	64.0%	64.0%	64.0%
Analysis Period (min)	15	15	15	15	15
d1 - Defacto Left Lane. Recode with 11 though lane as a left lane.					
i Phase conflict between lane groups.					
c Critical Lane Group					

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HCM Signalized Intersection Capacity Analysis 2005 Existing Conditions - PM Peak Hour  
9: Mercer St & Westlake Ave 500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4TH						4TH					
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	12	12	12	12	11	12	12	12	12	12
Total Lost time (s)	3.0						3.0					
Lane Util. Factor	0.86						0.86					
Flt	1.00						0.86					
Flt Protected	1.00						1.00					
Satd. Flow (prot)	5617						4143					
Flt Permitted	1.00						1.00					
Satd. Flow (perm)	5617						4143					
Volume (vph)	130	2580	0	0	0	0	0	815	390	0	0	0
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	131	2606	0	0	0	0	0	823	394	0	0	0
RTOR Reduction (vph)	0	5	0	0	0	0	0	1	1	0	0	0
Lane Group Flow (vph)	0	2732	0	0	0	0	0	940	275	0	0	0
Heavy Vehicles (%)	1%	1%	1%	0%	0%	0%	1%	1%	1%	0%	0%	0%
Turn Type	Perm	Perm					Perm	Perm	Perm			
Protected Phases	1						2					
Permitted Phases	1						2					
Actuated Green, G (s)	75.2						33.8					
Effective Green, g (s)	77.7						36.3					
Actuated g/C Ratio	0.65						0.30					
Clearance Time (s)	5.5						5.5					
Vehicle Extension (s)	3.0						3.0					
Lane Grp Cap (vph)	3637						1253					
v/s Ratio Prot							c0.23					
v/s Ratio Perm	0.49						0.22					
v/c Ratio	0.75						0.75					
Uniform Delay, d1	14.5						37.8					
Progression Factor	0.80						0.86					
Incremental Delay, d2	1.1						2.4					
Delay (s)	12.7						34.7					
Level of Service	B						C					
Approach Delay (s)	12.7						35.5					
Approach LOS	B						D					
Intersection Summary												
HCM Average Control Delay							19.8					
HCM Volume to Capacity ratio							0.75					
Actuated Cycle Length (s)							120.0					
Intersection Capacity Utilization							71.1%					
Analysis Period (min)							15					
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis 2005 Existing Conditions - PM Peak Hour  
10: Mercer St & Fairview Ave 500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4TH						4TH					
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	12	12	12	12	12	10	12	12	12	12
Total Lost time (s)	3.0						3.0					
Lane Util. Factor	0.91						0.88					
Flt	1.00						0.85					
Flt Protected	1.00						0.85					
Satd. Flow (prot)	4512						3120					
Flt Permitted	1.00						0.95					
Satd. Flow (perm)	4512						3120					
Volume (vph)	5	2965	315	70	370	1885	235	1010	5	65		
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97		
Adj. Flow (vph)	5	3057	325	72	381	1943	242	1041	5	67		
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0		
Lane Group Flow (vph)	0	3062	390	0	381	1844	242	1046	0	67		
Heavy Vehicles (%)	0%	0%	0%	0%	1%	1%	0%	0%	0%	0%		
Turn Type	Split	Prot	Prot				Prot	Prot	pt-ov			
Protected Phases	1f	1	1				2	1,2	3	2,3		
Permitted Phases								1,2				
Actuated Green, G (s)		69.5	69.5				12.5	87.5	17.5	35.5		
Effective Green, g (s)		72.0	72.0				15.0	90.0	24.0	42.0		
Actuated g/C Ratio		0.60	0.60				0.12	0.75	0.20	0.35		
Clearance Time (s)		5.5	5.5				5.5	9.5	9.5	9.5		
Vehicle Extension (s)		3.0	3.0				3.0	3.0	3.0	3.0		
Lane Grp Cap (vph)		2707	872				390	1900	319	895		
v/s Ratio Prot		c0.68	0.27				0.12	0.73	0.15	c0.41		
v/s Ratio Perm												
v/c Ratio		1.13	0.45				0.98	0.97	0.76	1.17		
Uniform Delay, d1		24.0	13.1				52.3	13.8	45.3	39.0		
Progression Factor		0.78	0.53				1.00	1.00	1.00	1.00		
Incremental Delay, d2		63.5	1.4				39.1	14.3	9.9	87.9		
Delay (s)		82.1	8.4				91.4	28.1	55.2	126.9		
Level of Service		F	A				F	C	E	F		
Approach Delay (s)		73.6							113.5			
Approach LOS		E							F			
Intersection Summary												
HCM Average Control Delay							68.9					
HCM Volume to Capacity ratio							1.14					
Actuated Cycle Length (s)							120.0					
Intersection Capacity Utilization							160.8%					
Analysis Period (min)							15					
f Phase conflict between lane groups												
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis 2005 Existing Conditions - PM Peak Hour  
11: Republican St & 5th Ave

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	0.95	1.00	0.91	1.00	0.99	1.00	0.99	1.00	0.95	1.00	0.95
Flpb. ped/bikes	1.00	0.98	1.00	1.00	1.00	0.99	1.00	0.99	1.00	0.95	1.00	0.95
Flpb. ped/bikes	0.98	1.00	0.86	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	1.00	0.85	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	1644	1448	1464	4907	1669	3312						
Flt Permitted	0.96	1.00	0.55	1.00	0.18	1.00						
Satd. Flow (perm)	1644	1448	844	4907	325	3312						
Volume (vph)	0	0	0	20	5	20	20	1180	10	10	305	10
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	0	0	0	22	5	22	22	1269	11	11	328	11
RTOR Reduction (vph)	0	0	0	0	0	17	0	1	0	0	2	0
Lane Group Flow (vph)	0	0	0	27	5	22	1279	0	11	337	0	0
Conf. Peds. (#/hr)	10	20	20	10	75	20	20	20	20	20	75	20
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	2%	2%	4%	4%	4%
Parking (#/hr)	8											
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	6	6	6	8								
Permitted Phases	6	6	6	8								
Actuated Green, G (s)	16.0	16.0	53.0	53.0	53.0	53.0	53.0	53.0	53.0	53.0	53.0	53.0
Effective Green, g (s)	18.0	18.0	56.0	56.0	56.0	56.0	56.0	56.0	56.0	56.0	56.0	56.0
Actuated g/C Ratio	0.22	0.22	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70
Clearance Time (s)	5.0	5.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	370	326	591	3435								
v/s Ratio Prot				c0.26								
v/s Ratio Perm	0.02	0.00	0.03									
v/c Ratio	0.07	0.02	0.04	0.37								
Uniform Delay, d1	24.4	24.1	3.7	4.9								
Progression Factor	1.00	1.00	0.92	0.63								
Incremental Delay, d2	0.1	0.0	0.1	0.3								
Delay (s)	24.5	24.1	3.5	3.3								
Level of Service	C	C	C	A								
Approach Delay (s)	0.0			24.3								
Approach LOS	A			C								
Intersection Summary												
HCM Average Control Delay	3.7											
HCM Volume to Capacity ratio	0.30											
Actuated Cycle Length (s)	80.0											
Intersection Capacity Utilization	40.6%											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis 2005 Existing Conditions - PM Peak Hour  
12: Harrison St & 5th Ave

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	0.98	1.00	0.95	1.00	0.95	1.00	0.95
Flpb. ped/bikes	1.00	0.90	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	1.00	0.99
Flpb. ped/bikes	1.00	1.00	1.00	0.95	1.00	0.90	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.95	1.00	1.00	1.00	1.00
Satd. Flow (prot)	1517	1221	1692	2748	1517	3332						
Flt Permitted	0.74	1.00	0.90	1.00	0.54	1.00						
Satd. Flow (perm)	1181	1221	1571	2748	856	3332						
Volume (vph)	15	0	25	15	10	665	25	530	15	5	300	10
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	16	0	27	16	11	731	27	582	16	5	330	11
RTOR Reduction (vph)	0	18	0	0	0	0	0	2	0	0	2	0
Lane Group Flow (vph)	16	9	0	0	27	731	27	596	0	0	344	0
Conf. Peds. (#/hr)	19%	19%	19%	19%	0%	0%	0%	4%	4%	4%	4%	4%
Heavy Vehicles (%)	19%	19%	19%	19%	0%	0%	0%	4%	4%	4%	4%	4%
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	2	2	6	6	6	6	6	6	6	6	6	6
Permitted Phases	2	2	6	6	6	6	6	6	6	6	6	6
Actuated Green, G (s)	25.6	25.6	25.6	25.6	25.6	25.6	25.6	25.6	25.6	25.6	25.6	25.6
Effective Green, g (s)	26.6	26.6	26.6	26.6	26.6	26.6	26.6	26.6	26.6	26.6	26.6	26.6
Actuated g/C Ratio	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	393	406	522	914	507	1974						
v/s Ratio Prot	0.01			c0.27								
v/s Ratio Perm	0.01			0.02								
v/c Ratio	0.04	0.02	0.05	0.80	0.05	0.30						
Uniform Delay, d1	18.1	18.0	18.1	24.3	6.9	8.1						
Progression Factor	1.00	1.00	1.00	1.00	1.52	1.46						
Incremental Delay, d2	0.0	0.0	0.0	0.0	0.1	0.2						
Delay (s)	18.1	18.0	18.2	29.2	10.6	12.0						
Level of Service	B	B	B	C	B	B						
Approach Delay (s)	18.0			28.8								
Approach LOS	B			C								
Intersection Summary												
HCM Average Control Delay	19.8											
HCM Volume to Capacity ratio	0.48											
Actuated Cycle Length (s)	80.0											
Intersection Capacity Utilization	61.7%											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis 2005 Existing Conditions - PM Peak Hour  
13: Harrison St & Broad St 500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Sign Control	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Volume (veh/h)	0	0	5	0	0	60	0	660	15	0	965	665
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	0	0	5	0	0	62	0	680	15	0	995	686
Pedestrians	20											
Lane Width (ft)	11.0											
Walking Speed (ft/s)	4.0											
Percent Blockage	2											
Right turn flare (veh)												
Median type	None											
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1760	2054	860	1186	2389	348	1700					696
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1760	2054	860	1186	2389	348	1700					696
tC, single (s)	7.5	6.5	6.9	7.6	6.6	7.0	4.1					4.1
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.6	4.0	3.4	2.2					2.2
p0 queue free %	100	100	98	100	100	90	100					100
cM capacity (veh/h)	48	55	299	137	32	640	369					903
Direction, Lane #	EB 1	WB 1	NE 1	NE 2	SW 1	SW 2						
Volume Total	5	62	454	242	663	1017						
Volume Left	0	0	0	0	0	0						
Volume Right	5	62	0	15	0	686						
cSH	299	640	1700	1700	1700	1700						
Volume to Capacity	0.02	0.10	0.27	0.14	0.39	0.60						
Queue Length 95th (ft)	1	8	0	0	0	0						
Control Delay (s)	17.3	11.2	0.0	0.0	0.0	0.0						
Lane LOS	C	B										
Approach Delay (s)	17.3	11.2	0.0		0.0							
Approach LOS	C	B										
Intersection Summary												
Average Delay			0.3									
Intersection Capacity Utilization			58.8%									
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis 2005 Existing Conditions - PM Peak Hour  
14: 5th Ave & Broad St 500 Fifth Avenue North

Movement	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations	1P	1P	1P	1P	1P	1P	1P	1P	1P	1P	1P	1P
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	12	12	11	11	11	11	12	11	11	12
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Fltnb, ped/bikes	0.99	1.00	0.99	1.00	0.95	1.00	1.00	0.95	1.00	0.99	1.00	0.99
Fltpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt	0.98	1.00	0.98	1.00	0.95	1.00	1.00	0.95	1.00	0.98	1.00	0.98
Flt Protected	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00
Satd, Flow (prot)	3211	3331	3331	3331	1894	3388	1894	3388	1894	3388	3388	3388
Flt Permitted	0.95	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Satd, Flow (perm)	3054	3331	3331	3331	1894	3388	1894	3388	1894	3388	3388	3388
Volume (vph)	5	375	50	0	270	60	170	540	0	120	630	20
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	5	403	54	0	290	65	183	581	0	129	677	22
RTOR Reduction (vph)	0	13	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	449	0	0	290	65	183	581	0	129	696	0
Confl. Peds. (#/hr)	115	85	85	115	130	45	45	130	45	45	130	45
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Bus Blockages (#/hr)	0	20	0	0	18	0	0	0	0	0	0	0
Turn Type												
Protected Phases	8		4		5		2			1		6
Permitted Phases												
Actuated Green, G (s)	21.0		21.0		21.0		21.0			21.0		21.0
Effective Green, g (s)	27.0		27.0		27.0		27.0			27.0		27.0
Actuated g/C Ratio	0.34		0.34		0.34		0.34			0.34		0.34
Clearance Time (s)	9.0		9.0		9.0		9.0			9.0		9.0
Lane Grp Cap (vph)	1031		1124		445		360			1143		350
v/s Ratio Prot			0.09		c0.11		0.17			0.08		c0.21
v/s Ratio Perm	c0.15				0.05							
v/c Ratio	2.84dr		0.26		0.15		0.51			0.37		0.63
Uniform Delay, d1	19.2		18.5		27.8		21.2			26.9		22.3
Progression Factor	0.94		0.47		0.34		1.23			0.84		1.00
Incremental Delay, d2	1.3		0.6		0.7		4.6			3.0		2.8
Delay (s)	20.8		9.5		7.0		38.8			29.9		25.1
Level of Service	C		A		A		D			B		C
Approach Delay (s)	20.8		9.1		23.9					25.9		
Approach LOS	C		A		C					C		
Intersection Summary												
HCM Average Control Delay			21.8									
HCM Volume to Capacity ratio			0.53									
Actuated Cycle Length (s)			80.0									
Intersection Capacity Utilization			61.6%									
Analysis Period (min)			15									
dr Defacto Right Lane. Recode with 1 through lane as a right lane.												
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis 2005 Existing Conditions - PM Peak Hour  
15: Denny Way & 1st Avenue 500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SBL	SBR	NWL	NWR
Lane Configurations	100	100	100	100	100	100	100	100	100	100
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Flt Protected	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Permitted	3348	3348	3348	3348	3348	3348	3348	3348	3348	3348
Satd. Flow (perm)	3348	3348	3348	3348	3348	3348	3348	3348	3348	3348
Volume (vph)	0	1095	340	0	1075	360	0	0	350	15
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	0	1165	362	0	1144	383	0	0	372	16
RTOR Reduction (vph)	0	30	0	0	60	0	0	0	0	0
Lane Group Flow (vph)	0	1497	0	0	1467	0	0	0	372	16
Heavy Vehicles (%)	4%	4%	4%	3%	3%	3%	0%	0%	5%	5%
Turn Type	1	1	1	1	1	1	1	1	1	1
Protected Phases	1	1	1	1	1	1	1	1	1	1
Permitted Phases	1	1	1	1	1	1	1	1	1	1
Actuated Green, G (s)	57.0	57.0	57.0	57.0	57.0	57.0	57.0	57.0	57.0	57.0
Effective Green, g (s)	59.0	59.0	59.0	59.0	59.0	59.0	59.0	59.0	59.0	59.0
Actuated g/C Ratio	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lane Grp Cap (vph)	1975	2859	602	511	602	511	602	511	602	511
v/s Ratio Prot	c0.45	0.30	c0.22	0.01	c0.22	0.01	c0.22	0.01	c0.22	0.01
v/c Ratio	0.76	0.51	0.62	0.03	0.62	0.03	0.62	0.03	0.62	0.03
Uniform Delay, d1	15.2	12.1	27.0	21.4	27.0	21.4	27.0	21.4	27.0	21.4
Progression Factor	1.00	0.43	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.8	0.5	4.7	0.1	4.7	0.1	4.7	0.1	4.7	0.1
Level of Service	B	A	C	C	C	C	C	C	C	C
Approach Delay (s)	18.0	5.7	31.7	21.5	31.7	21.5	31.7	21.5	31.7	21.5
Approach LOS	B	A	C	C	C	C	C	C	C	C
Intersection Summary										
HCM Average Control Delay	14.0	HCM Level of Service								
HCM Volume to Capacity ratio	0.71	B								
Actuated Cycle Length (s)	100.0	Sum of lost time (s)								
Intersection Capacity Utilization	67.5%	ICU Level of Service								
Analysis Period (min)	15	C								
c Critical Lane Group										

HCM Signalized Intersection Capacity Analysis 2005 Existing Conditions - PM Peak Hour  
16: Denny Way & Broad St 500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR	
Lane Configurations	↕↕	↕↕		↕↕	↕↕			↕↕	↕↕		↕↕	↕↕	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width	12	11	12	12	11	12	12	10	12	12	10	9	
Total Lost time (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	
Lane Util. Factor	0.95	0.95		0.95	0.95		0.95	0.95	0.95	0.95	0.95	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99	1.00	0.95	1.00	0.95	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	
Flt	1.00	1.00		1.00	1.00		1.00	0.98	1.00	0.85	1.00	0.85	
Flt Protected	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	
Satd. Flow (prot)	3364	3364		3290	3290		3260	3260	3334	1374	1374	3334	
Flt Permitted	0.92	1.00		1.00	1.00		1.00	1.00	0.95	1.00	1.00	0.95	
Satd. Flow (perm)	3082	3082		3290	3290		3260	3260	3168	1374	1374	3168	
Volume (vph)	15	690	0	0	1170	10	0	490	55	5	455	275	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	
Adj. Flow (vph)	16	734	0	0	1245	11	0	521	59	5	484	293	
RTOR Reduction (vph)	0	0	0	0	1	0	0	9	0	0	0	41	
Lane Group Flow (vph)	0	750	0	0	1255	0	0	571	0	0	489	252	
Conf. Peds. (#/hr)	22	12	12	12	22	18	34	34	18	34	18	18	
Heavy Vehicles (%)	3%	3%	3%	1%	1%	1%	1%	1%	1%	1%	1%	1%	
Bus Blockages (#/hr)	0	3	0	0	23	0	0	0	0	0	0	0	
Turn Type	1	1	1	1	1	1	1	1	1	1	1	1	
Protected Phases	1	1	1	1	1	1	1	1	1	1	1	1	
Permitted Phases	1	1	1	1	1	1	1	1	1	1	1	1	
Actuated Green, G (s)	58.0	58.0	58.0	58.0	58.0	58.0	32.0	32.0	32.0	32.0	32.0	32.0	
Effective Green, g (s)	60.0	60.0	60.0	60.0	60.0	60.0	34.0	34.0	34.0	34.0	34.0	34.0	
Actuated g/C Ratio	0.60	0.60	0.60	0.60	0.60	0.60	0.34	0.34	0.34	0.34	0.34	0.34	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Lane Grp Cap (vph)	1849	1974	1974	1974	1974	1974	1108	1108	1077	467	467	467	
v/s Ratio Prot	0.24	c0.38	c0.38	c0.38	c0.38	c0.38	0.18	0.18	0.15	c0.18	c0.18	c0.18	
v/c Ratio	0.41	0.64	0.64	0.64	0.64	0.64	0.52	0.52	0.45	0.54	0.45	0.54	
Uniform Delay, d1	10.6	12.9	12.9	12.9	12.9	12.9	26.4	26.4	25.8	26.7	25.8	26.7	
Progression Factor	2.25	0.61	0.61	0.61	0.61	0.61	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.4	1.4	1.4	1.4	1.4	1.4	1.7	1.7	1.4	1.4	1.4	1.4	
Delay (s)	24.2	9.2	9.2	9.2	9.2	9.2	28.1	28.1	27.1	31.1	27.1	31.1	
Level of Service	C	A	A	A	A	A	C	C	C	C	C	C	
Approach Delay (s)	24.2	9.2	9.2	9.2	9.2	9.2	28.1	28.1	28.6	28.6	28.1	28.6	
Approach LOS	C	A	A	A	A	A	C	C	C	C	C	C	
Intersection Summary													
HCM Average Control Delay	20.3						HCM Level of Service						C
HCM Volume to Capacity ratio	0.60						B						6.0
Actuated Cycle Length (s)	100.0						Sum of lost time (s)						6.0
Intersection Capacity Utilization	58.1%						ICU Level of Service						B
Analysis Period (min)	15						Critical Lane Group						C

HCM Signalized Intersection Capacity Analysis 2005 Existing Conditions - PM Peak Hour  
17: Denny Way & 5th Ave 500 Fifth Avenue North

Movement	EBT	EBR	EBR2	WBT	WBR	NBL	NBT	NBR	NBR2	SBL2	SBL	SBLT
Lane Configurations	1P	1P	1P	1P	1P	1P	1P	1P	1P	1P	1P	1P
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	10	12	10	12	10	12	12	11	12	13
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Frpb, ped/bikes	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Flt Protected	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	3273	3197	3197	2954	2954	2954	2954	2954	2954	1752	1874	1874
Flt Permitted	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3273	3197	3197	2954	2954	2954	2954	2954	2954	1752	1874	1874
Volume (vph)	675	155	15	580	125	5	145	35	10	105	175	105
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	718	165	16	617	133	5	154	37	11	112	186	112
RTOR Reduction (vph)	1	0	0	16	0	0	4	0	0	0	0	4
Lane Group Flow (vph)	888	0	0	734	0	0	203	0	0	0	298	119
Conf. Peds. (#/hr)	2	2	2	1	1	1	6	6	6	6	3	3
Heavy Vehicles (%)	2	2	2	1	1	1	6	6	6	6	3	3
Bus Blockages (#/hr)	3	0	0	4	0	0	18	0	0	0	0	0
Turn Type	1	1	1	3	3	3	3	3	3	2	2	2
Protected Phases	1	1	1	3	3	3	3	3	3	2	2	2
Permitted Phases	1	1	1	3	3	3	3	3	3	2	2	2
Actuated Green, G (s)	51.8	51.8	51.8	11.8	11.8	11.8	11.8	11.8	11.8	21.4	21.4	21.4
Effective Green, g (s)	53.8	53.8	53.8	13.8	13.8	13.8	13.8	13.8	13.8	23.4	23.4	23.4
Actuated g/C Ratio	0.54	0.54	0.54	0.14	0.14	0.14	0.14	0.14	0.14	0.23	0.23	0.23
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1761	1720	1720	408	408	408	408	408	408	410	439	439
v/s Ratio Prot	c0.27	c0.27	c0.27	c0.07	c0.07	c0.07	c0.07	c0.07	c0.07	c0.17	c0.06	c0.06
v/s Ratio Perm	0.51	0.51	0.51	0.43	0.43	0.43	0.50	0.50	0.50	0.73	0.27	0.27
Uniform Delay, d1	14.7	13.9	13.9	39.9	39.9	39.9	35.4	35.4	35.4	31.3	31.3	31.3
Progression Factor	0.15	0.80	0.80	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.8	0.7	0.7	1.0	1.0	1.0	0.3	0.3	0.3	0.3	0.3	0.3
Delay (s)	2.9	11.8	11.8	40.8	40.8	40.8	41.7	41.7	41.7	31.7	31.7	31.7
Level of Service	A	B	B	D	D	D	D	D	D	D	C	C
Approach Delay (s)	2.9	11.8	11.8	40.8	40.8	40.8	41.7	41.7	41.7	31.7	31.7	31.7
Approach LOS	A	B	B	D	D	D	D	D	D	D	C	C
Intersection Summary												
HCM Average Control Delay	15.9	15.9	15.9	40.8	40.8	40.8	41.7	41.7	41.7	31.7	31.7	31.7
HCM Volume to Capacity ratio	0.56	0.56	0.56	0.14	0.14	0.14	0.14	0.14	0.14	0.23	0.23	0.23
Actuated Cycle Length (s)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Intersection Capacity Utilization	55.6%	55.6%	55.6%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Analysis Period (min)	15	15	15	15	15	15	15	15	15	15	15	15
Critical Lane Group												

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HCM Signalized Intersection Capacity Analysis 2005 Existing Conditions - PM Peak Hour  
17: Denny Way & 5th Ave 500 Fifth Avenue North

Movement	SBR
Lane Configurations	1P
Ideal Flow (vphpl)	1900
Lane Width	12
Total Lost time (s)	3.0
Lane Util. Factor	0.95
Frpb, ped/bikes	0.99
Flpb, ped/bikes	1.00
Flt	0.97
Flt Protected	1.00
Satd. Flow (prot)	3273
Flt Permitted	1.00
Satd. Flow (perm)	3273
Volume (vph)	10
Peak-hour factor, PHF	0.94
Adj. Flow (vph)	11
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Conf. Peds. (#/hr)	17
Heavy Vehicles (%)	3%
Bus Blockages (#/hr)	0
Turn Type	1
Protected Phases	1
Permitted Phases	1
Actuated Green, G (s)	51.8
Effective Green, g (s)	53.8
Actuated g/C Ratio	0.54
Clearance Time (s)	5.0
Vehicle Extension (s)	3.0
Lane Grp Cap (vph)	1761
v/s Ratio Prot	c0.27
v/s Ratio Perm	0.51
Uniform Delay, d1	14.7
Progression Factor	0.15
Incremental Delay, d2	0.8
Delay (s)	2.9
Level of Service	A
Approach Delay (s)	2.9
Approach LOS	A
Intersection Summary	

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HCM Signalized Intersection Capacity Analysis 2005 Existing Conditions - PM Peak Hour  
18: Denny Way & Aurora Ave 500 Fifth Avenue North

Movement	EBT	EBR	EBR2	WBT	WBR	NBT	NBR	NBR2	SBL2	SBL	SBT	SBR
Lane Configurations	11	12	11	12	11	12	12	12	12	12	12	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	11	12	11	12	12	12	12	12	12	12
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	1.00	0.95	1.00	0.95	0.95	0.95
Flt Protected	0.99	0.97	0.98	0.98	0.98	0.98	1.00	0.95	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3084	3084	3004	3167	3167	3167	1593	1332	1354	1354	1354	1354
Flt Permitted	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3084	3084	3004	3167	3167	3167	1593	1332	1354	1354	1354	1354
Volume (vph)	870	45	5	890	260	910	100	5	20	55	0	420
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	888	46	5	908	265	929	102	5	20	56	0	429
RTOR Reduction (vph)	0	0	0	28	0	0	0	0	0	0	0	3
Lane Group Flow (vph)	939	0	0	1145	0	1036	0	0	0	76	224	222
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	4	0
Turn Type	2	2	2	4	4	4	3	3	3	8	8	8
Protected Phases	25.0	31.0	31.0	49.7	49.7	49.7	8.3	61.0	61.0	61.0	61.0	61.0
Actuated Green, G (s)	31.0	31.0	31.0	49.7	49.7	49.7	10.3	63.0	63.0	63.0	63.0	63.0
Effective Green, g (s)	0.31	0.31	0.31	0.50	0.50	0.50	0.10	0.63	0.63	0.63	0.63	0.63
Actuated g/C Ratio	9.0	9.0	9.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Clearance Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Vehicle Extension (s)	966	931	931	1574	1574	1574	164	839	853	853	853	853
Lane Grp Cap (vph)	0.30	c0.38	c0.38	c0.33	c0.33	c0.33	c0.05	0.17	0.16	0.16	0.16	0.16
v/s Ratio Prot	0.98	1.23	1.23	0.66	0.66	0.66	0.46	0.27	0.26	0.26	0.26	0.26
v/s Ratio Perm	34.2	34.5	34.5	18.8	18.8	18.8	42.2	8.2	8.2	8.2	8.2	8.2
Uniform Delay, d1	0.99	0.60	0.60	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Progression Factor	23.6	111.5	111.5	1.0	1.0	1.0	2.1	0.2	0.2	0.2	0.2	0.2
Incremental Delay, d2	57.4	132.0	132.0	19.8	19.8	19.8	44.3	8.4	8.3	8.3	8.3	8.3
Delay (s)	E	F	F	B	B	B	D	A	A	A	A	A
Level of Service	E	F	F	B	B	B	D	A	A	A	A	A
Approach Delay (s)	57.4	132.0	132.0	19.8	19.8	19.8	44.3	8.4	8.3	8.3	8.3	8.3
Approach LOS	E	F	F	B	B	B	D	A	A	A	A	A

Intersection Summary			
HCM Average Control Delay	64.4	HCM Level of Service	E
HCM Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	82.8%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis 2005 Existing Conditions - PM Peak Hour  
18: Denny Way & Aurora Ave 500 Fifth Avenue North

Movement	SBR2
Lane Configurations	1900
Ideal Flow (vphpl)	12
Lane Width	12
Total Lost time (s)	
Lane Util. Factor	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Volume (vph)	20
Peak-hour factor, PHF	0.98
Adj. Flow (vph)	20
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Heavy Vehicles (%)	2%
Bus Blockages (#/hr)	0
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	
Intersection Summary	

HCM Signalized Intersection Capacity Analysis 2005 Existing Conditions - PM Peak Hour  
19: Denny Way & Dexter Avenue 500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4P	4P	4P	4P	4P	4P	4P	4P	4P	4P	4P	4P
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	12	12	11	12	12	11	12	12	12	12
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Flt Protected	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.95
Satd. Flow (prot)	3195	3206	3206	3206	3206	3206	3206	3206	3206	3206	3206	3206
Flt Permitted	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64
Satd. Flow (perm)	2048	2048	2048	2048	2048	2048	2048	2048	2048	2048	2048	2048
Volume (vph)	115	950	10	0	985	95	10	180	20	90	255	115
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	122	1011	11	0	1048	101	11	191	21	96	271	122
RTOR Reduction (vph)	0	0	0	0	5	0	0	11	0	0	0	100
Lane Group Flow (vph)	0	1144	0	0	1144	0	11	201	0	96	271	22
Heavy Vehicles (%)	1%	1%	1%	0%	0%	0%	11%	11%	11%	2%	2%	2%
Turn Type	pm+pt											
Protected Phases	2	5		1			Perm	3		Perm	3	Perm
Permitted Phases	5						3			3		3
Actuated Green, G (s)	72.6	54.6	15.4	15.4	54.6	15.4	15.4	15.4	15.4	15.4	15.4	15.4
Effective Green, g (s)	75.6	57.6	18.4	18.4	57.6	18.4	18.4	18.4	18.4	18.4	18.4	18.4
Actuated g/C Ratio	0.76	0.58	0.18	0.18	0.58	0.18	0.18	0.18	0.18	0.18	0.18	0.18
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1720	1947	130	531	1947	130	531	166	586	262		
v/s Ratio Prot	c0.10	0.36			0.62	0.02		c0.11		0.09		
v/s Ratio Perm	0.66				0.62	0.08	0.38	0.58	0.46	0.09		
v/c Ratio	6.0	14.0	33.8	35.8	14.0	33.8	35.8	37.3	36.4	33.8		
Uniform Delay, d1	1.01	0.62	1.00	1.00	0.62	1.00	1.00	1.00	1.00	1.00		
Progression Factor	0.6	1.4	0.3	0.5	0.6	1.4	0.3	0.5	0.6	0.1		
Incremental Delay, d2	6.8	10.1	34.1	36.2	6.8	10.1	34.1	36.2	42.1	37.0		
Delay (s)	A	B	C	D	B	C	D	D	D	D		
Level of Service	A	B	C	D	B	C	D	D	D	D		
Approach Delay (s)	6.6	10.1			10.1			36.1		37.2		
Approach LOS	A	B			B			D		D		
Intersection Summary												
HCM Average Control Delay	15.1											
HCM Volume to Capacity ratio	0.64											
Actuated Cycle Length (s)	100.0											
Intersection Capacity Utilization	92.0%											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis 2005 Existing Conditions - PM Peak Hour  
20: Denny Way & Westlake Ave 500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4P	4P	4P	4P	4P	4P	4P	4P	4P	4P	4P	4P
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	12	12	11	12	12	11	12	12	12	12
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Flt Protected	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	3110	3110	3110	3110	3110	3110	3110	3110	3110	3110	3110	3110
Flt Permitted	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (perm)	3110	3110	3110	3110	3110	3110	3110	3110	3110	3110	3110	3110
Volume (vph)	0	1195	0	0	1025	245	40	495	130	0	0	0
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	0	1271	0	0	1080	261	43	527	138	0	0	0
RTOR Reduction (vph)	0	0	0	0	13	0	0	52	0	0	0	0
Lane Group Flow (vph)	0	1271	0	0	1338	0	0	656	0	0	0	0
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	0%	0%
Turn Type		Perm										
Protected Phases		1					1			2		
Permitted Phases							2					
Actuated Green, G (s)		72.9					72.9			17.1		
Effective Green, g (s)		74.9					74.9			19.1		
Actuated g/C Ratio		0.75					0.75			0.19		
Clearance Time (s)		5.0					5.0			5.0		
Vehicle Extension (s)		3.0					3.0			3.0		
Lane Grp Cap (vph)		2329					2261			1041		
v/s Ratio Prot		0.41					c0.44			0.12		
v/s Ratio Perm										0.63		
v/c Ratio		0.55					0.59			0.37		
Uniform Delay, d1		5.3					5.7			37.2		
Progression Factor		1.04					1.00			1.00		
Incremental Delay, d2		0.8					1.1			1.3		
Delay (s)		6.3					6.8			38.5		
Level of Service		A					A			D		
Approach Delay (s)		6.3					6.8			38.5		
Approach LOS		A					A			D		
Intersection Summary												
HCM Average Control Delay		13.4										
HCM Volume to Capacity ratio		0.60										
Actuated Cycle Length (s)		100.0										
Intersection Capacity Utilization		57.9%										
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis 2005 Existing Conditions - PM Peak Hour  
21: Denny Way & Fairview Ave 500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1	1	1	1	1	1	1	1	1	1	1	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	12	11	11	12	9	10	12	10	10	12
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00	0.95	1.00	0.95
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1555	3107	1555	3062	1555	3062	2808	2865	1501	2862	1501	2862
Flt Permitted	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	1555	3107	1555	3062	1555	3062	2808	2865	1501	2862	1501	2862
Volume (vph)	110	875	5	45	665	75	410	410	180	135	230	105
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	115	911	5	47	693	78	427	427	188	141	240	109
RTOR Reduction (vph)	0	1	0	0	8	0	0	57	0	0	58	0
Lane Group Flow (vph)	115	915	0	47	763	0	427	558	0	141	291	0
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	1	6	5	2	3	8	7	4				
Permitted Phases												
Actuated Green, G (s)	11.7	40.8	5.8	34.9	17.9	24.4	9.0	15.5				
Effective Green, g (s)	13.7	42.8	7.8	36.9	19.9	26.4	11.0	17.5				
Actuated g/C Ratio	0.14	0.43	0.08	0.37	0.20	0.26	0.11	0.18				
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0				
Lane Grp Cap (vph)	213	1330	121	1130	559	756	165	501				
v/s Ratio Prot	c0.07	c0.29	0.03	0.25	c0.15	c0.19	c0.09	0.40				
v/s Ratio Perm												
v/c Ratio	0.54	0.69	0.39	0.68	0.76	0.74	0.85	0.58				
Uniform Delay, d1	40.2	23.2	43.8	26.5	37.8	33.6	43.7	37.9				
Progression Factor	1.00	1.00	0.89	1.34	1.00	1.00	1.16	0.74				
Incremental Delay, d2	2.6	2.9	1.7	2.7	6.1	3.8	29.5	1.5				
Delay (s)	42.8	26.1	40.5	38.3	44.0	37.4	80.3	29.4				
Level of Service	D	C	D	D	D	D	F	C				
Approach Delay (s)	28.0			38.4		40.1		44.1				
Approach LOS	C			D		D		D				
Intersection Summary												
HCM Average Control Delay	36.6											
HCM Volume to Capacity ratio	0.69											
Actuated Cycle Length (s)	100.0											
Intersection Capacity Utilization	71.9%											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis 2005 Existing Conditions - PM Peak Hour  
22: Denny Way & Stewart St 500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1	1	1	1	1	1	1	1	1	1	1	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	1.00	1.00	1.00	1.00	1.00	0.93	1.00	1.00	0.99	0.99	0.99
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.99	0.99
Satd. Flow (prot)	2981	2981	1593	1676	1593	1676	1593	1676	1593	1676	1593	1676
Flt Permitted	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.99	0.99
Satd. Flow (perm)	2981	2981	1593	1676	1593	1676	1593	1676	1593	1676	1593	1676
Volume (vph)	0	615	590	280	710	0	0	0	0	0	125	805
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	0	628	602	286	724	0	0	0	0	0	128	821
RTOR Reduction (vph)	0	61	0	0	0	0	0	0	0	0	0	7
Lane Group Flow (vph)	0	1169	0	286	724	0	0	0	0	0	968	0
Heavy Vehicles (%)	1%	1%	1%	2%	2%	2%	0%	0%	0%	0%	11%	11%
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	3	2	2	2	3	1	1					
Permitted Phases												
Actuated Green, G (s)	43.2	21.5	69.2									
Effective Green, g (s)	44.7	23.0	70.7									
Actuated g/C Ratio	0.45	0.23	0.71									
Clearance Time (s)	4.5	4.5	4.5									
Vehicle Extension (s)	3.0	3.0	3.0									
Lane Grp Cap (vph)	1333	366	1185									
v/s Ratio Prot	c0.39	c0.18	0.43									
v/s Ratio Perm												
v/c Ratio	0.88	0.78	0.61									
Uniform Delay, d1	25.1	36.1	7.6									
Progression Factor	0.91	1.00	1.00									
Incremental Delay, d2	6.5	15.2	0.9									
Delay (s)	29.5	51.4	8.5									
Level of Service	C	D	A									
Approach Delay (s)	29.5		20.6									
Approach LOS	C		C									
Intersection Summary												
HCM Average Control Delay	30.8											
HCM Volume to Capacity ratio	0.84											
Actuated Cycle Length (s)	100.0											
Intersection Capacity Utilization	83.1%											
Analysis Period (min)	15											
c Critical Lane Group												



HCM Signalized Intersection Capacity Analysis  
23: Yale St & Stewart St  
2005 Existing Conditions - PM Peak Hour  
500 Fifth Avenue North

[illegible]

## 2010 Alternative 1

HCM Signalized Intersection Capacity Analysis 2010 Baseline Conditions - AM Peak Hour  
1: Roy St & 5th Ave 500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	12	12	12	11	12	11	11	11	12	11	11	12
Lane Width	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Total Lost time (s)	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00	0.95	1.00	1.00
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Frpb, ped/bikes	0.97	1.00	1.00	0.98	1.00	0.98	1.00	0.98	1.00	1.00	1.00	1.00
Flpb, ped/bikes	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt	0.98	0.95	0.95	0.99	0.95	0.99	1.00	0.97	1.00	0.97	1.00	0.97
Flt Protected	0.98	0.95	0.95	0.99	0.95	0.99	1.00	0.97	1.00	0.97	1.00	0.97
Satd. Flow (prot)	1421	1421	1421	1364	1330	1364	1330	1662	1432	1662	1432	1662
Flt Permitted	0.98	0.95	0.95	0.99	0.95	0.99	1.00	0.97	1.00	0.97	1.00	0.97
Satd. Flow (perm)	1421	1421	1421	1364	1330	1364	1330	1662	1432	1662	1432	1662
Volume (vph)	0	0	0	35	40	5	370	145	55	15	230	60
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	37	42	5	389	153	58	16	242	63
RTOR Reduction (vph)	0	0	0	1	0	0	0	7	0	0	6	0
Lane Group Flow (vph)	0	0	0	83	0	323	270	0	16	239	0	28
Conf. Peds. (#/hr)	7	20	14	14	14	14	12	12	12	28	28	28
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	6%	6%	6%	5%	5%	5%
Parking (#/hr)	0	0	0	0	0	0	8	8	8	8	8	8
Turn Type	Protected Phases	Permitted Phases	Permitted Phases	Protected Phases	Permitted Phases	Permitted Phases	Protected Phases	Permitted Phases	Permitted Phases	Protected Phases	Permitted Phases	Permitted Phases
Actuated Green, G (s)	33.0	33.0	33.0	53.0	53.0	53.0	53.0	53.0	36.0	36.0	36.0	36.0
Effective Green, g (s)	36.0	36.0	36.0	56.0	56.0	56.0	56.0	56.0	39.0	39.0	39.0	39.0
Actuated g/C Ratio	0.26	0.26	0.26	0.40	0.40	0.40	0.40	0.40	0.28	0.28	0.28	0.28
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lane Grp Cap (vph)	365	365	365	626	532	463	399	463	399	463	399	463
v/s Ratio Prot	0.06	0.23	0.23	0.52	0.51	0.51	0.51	0.51	0.03	0.75	0.75	0.75
v/s Ratio Perm	0.23	0.23	0.23	0.17	0.15	0.15	0.15	0.15	1.00	1.00	1.00	1.00
Uniform Delay, d1	41.0	41.0	41.0	31.8	31.6	31.6	31.6	31.6	36.8	46.0	46.0	46.0
Progression Factor	0.99	0.99	0.99	0.17	0.15	0.15	0.15	0.15	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.4	1.4	1.4	2.7	3.0	3.0	3.0	3.0	0.1	12.1	12.1	12.1
Delay (s)	42.1	42.1	42.1	34.5	34.6	34.6	34.6	34.6	36.9	58.1	58.1	58.1
Level of Service	D	D	D	A	A	A	A	A	D	E	E	E
Approach Delay (s)	42.1	42.1	42.1	34.5	34.6	34.6	34.6	34.6	36.9	58.1	58.1	58.1
Approach LOS	D	D	D	A	A	A	A	A	D	E	E	E
Intersection Summary												
HCM Average Control Delay	26.5											
HCM Volume to Capacity ratio	0.51											
Actuated Cycle Length (s)	140.0											
Intersection Capacity Utilization	53.2%											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis 2010 Baseline Conditions - AM Peak Hour  
2: Broad St & 9th Ave 500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	11	12	12	10	10	11	12	12	10	11	12	12
Lane Width	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Total Lost time (s)	0.95	1.00	1.00	0.95	0.95	0.95	1.00	1.00	0.95	0.95	1.00	1.00
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt	0.94	0.94	0.94	0.99	0.99	0.99	1.00	0.95	1.00	0.95	1.00	0.95
Flt Protected	1.00	1.00	1.00	0.95	0.95	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Satd. Flow (prot)	2854	2854	2854	1478	2939	1478	2939	3759	1223	3759	1223	3759
Flt Permitted	1.00	1.00	1.00	0.21	1.00	0.21	1.00	0.99	1.00	0.99	1.00	0.99
Satd. Flow (perm)	2854	2854	2854	327	2939	327	2939	3759	1223	3759	1223	3759
Volume (vph)	255	190	250	1695	140	170	670	95	5	170	670	95
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	271	202	266	1803	149	181	713	101	5	181	713	101
RTOR Reduction (vph)	112	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	361	0	266	1952	0	0	894	105	0	0	894	105
Conf. Peds. (#/hr)	50	50	50	50	50	50	50	50	50	50	50	50
Heavy Vehicles (%)	3%	3%	2%	2%	2%	2%	3%	3%	3%	3%	3%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Turn Type	Protected Phases	Permitted Phases	Permitted Phases	Protected Phases	Permitted Phases	Permitted Phases	Protected Phases	Permitted Phases	Permitted Phases	Protected Phases	Permitted Phases	Permitted Phases
Actuated Green, G (s)	16.5	16.5	16.5	75.0	80.5	75.0	80.5	80.5	28.5	28.5	28.5	28.5
Effective Green, g (s)	19.0	19.0	19.0	80.0	83.0	80.0	83.0	83.0	31.0	31.0	31.0	31.0
Actuated g/C Ratio	0.16	0.16	0.16	0.67	0.69	0.67	0.69	0.69	0.26	0.26	0.26	0.26
Clearance Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	452	452	452	803	2033	803	2033	2033	971	316	971	316
v/s Ratio Prot	0.13	0.13	0.13	0.17	0.66	0.17	0.66	0.66	0.24	0.09	0.24	0.09
v/s Ratio Perm	0.80	0.80	0.80	0.33	0.96	0.33	0.96	0.96	0.92	0.33	0.92	0.33
Uniform Delay, d1	48.7	48.7	48.7	14.3	17.0	14.3	17.0	17.0	43.3	36.1	43.3	36.1
Progression Factor	1.00	1.00	1.00	0.30	0.32	0.30	0.32	0.32	1.00	1.00	1.00	1.00
Incremental Delay, d2	13.7	13.7	13.7	0.1	6.6	0.1	6.6	6.6	13.6	0.6	13.6	0.6
Delay (s)	62.4	62.4	62.4	14.4	23.6	14.4	23.6	23.6	56.9	36.7	56.9	36.7
Level of Service	E	E	E	A	B	A	B	B	E	D	E	D
Approach Delay (s)	62.4	62.4	62.4	14.4	23.6	14.4	23.6	23.6	56.9	36.7	56.9	36.7
Approach LOS	E	E	E	A	B	A	B	B	E	D	E	D
Intersection Summary												
HCM Average Control Delay	29.5											
HCM Volume to Capacity ratio	0.95											
Actuated Cycle Length (s)	120.0											
Intersection Capacity Utilization	81.9%											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis 2010 Baseline Conditions - AM Peak Hour  
3: Broad St & Westlake Ave 500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4P	4P	4P	4P	4P	4P	4P	4P	4P	4P	4P	4P
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	12	12	10	12	12	12	10	12	12	12
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	1.00	0.95	1.00	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	0.98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.98	1.00	1.00	0.85	1.00	0.91	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	2881	1608	3002	1439	1507	2704	1624	1710	1624	1710	1624	1710
Flt Permitted	0.83	0.49	1.00	1.00	0.41	1.00	0.21	1.00	0.21	1.00	0.21	1.00
Satd. Flow (perm)	2469	828	3002	1439	654	2704	360	1710	360	1710	360	1710
Volume (vph)	15	340	60	265	1945	770	55	215	325	55	210	0
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	16	354	62	276	2026	802	57	224	339	57	219	0
RTOR Reduction (vph)	0	12	0	0	0	87	0	227	0	0	0	0
Lane Group Flow (vph)	0	420	0	276	2026	715	57	336	0	57	219	0
Confli. Peds. (#/hr)	50	50	50	50	50	50	50	50	50	50	50	50
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	2	2	2	2	2	2	2	2	2	2	2	2
Permitted Phases	2	2	2	2	2	2	2	2	2	2	2	2
Actuated Green, G (s)	82.8	82.8	82.8	82.8	82.8	82.8	26.2	26.2	26.2	26.2	26.2	26.2
Effective Green, g (s)	85.3	85.3	85.3	85.3	85.3	85.3	28.7	28.7	28.7	28.7	28.7	28.7
Actuated g/C Ratio	0.71	0.71	0.71	0.71	0.71	0.71	0.24	0.24	0.24	0.24	0.24	0.24
Clearance Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1755	589	2134	1023	156	647	86	409	86	409	86	409
v/s Ratio Prot	0.17	0.33	0.33	0.50	0.09	0.12	0.16	0.13	0.16	0.13	0.16	0.13
v/s Ratio Perm	0.24	0.47	0.95	0.70	0.37	0.52	0.66	0.54	0.66	0.54	0.66	0.54
Uniform Delay, d1	6.0	7.5	15.4	10.0	38.1	39.7	41.3	39.8	41.3	39.8	41.3	39.8
Progression Factor	0.64	0.70	0.54	0.50	1.37	2.13	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.0	0.4	6.9	1.3	4.1	1.9	33.7	5.0	33.7	5.0	33.7	5.0
Delay (s)	3.9	5.6	15.2	6.3	56.3	86.4	74.9	44.8	74.9	44.8	74.9	44.8
Level of Service	A	A	B	A	E	F	E	D	E	D	E	D
Approach Delay (s)	3.9	5.6	15.2	6.3	56.3	86.4	74.9	44.8	74.9	44.8	74.9	44.8
Approach LOS	A	A	B	A	E	F	E	D	E	D	E	D
Intersection Summary												
HCM Average Control Delay	23.7											
HCM Volume to Capacity ratio	0.88											
Actuated Cycle Length (s)	120.0											
Intersection Capacity Utilization	110.8%											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis 2010 Baseline Conditions - AM Peak Hour  
4: Valley St & Fairview Ave 500 Fifth Avenue North

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	4P	4P	4P	4P	4P	4P
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	10	12	12	12	12	12
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	1.00	1.00	1.00	0.95	1.00
Flt Protected	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	2944	1411	812	3124	4491	1425
Flt Permitted	1.00	1.00	0.15	1.00	0.95	1.00
Satd. Flow (perm)	2944	1411	125	3124	4491	1425
Volume (vph)	630	20	5	680	2190	635
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	670	21	5	723	2330	676
RTOR Reduction (vph)	0	5	0	0	0	9
Lane Group Flow (vph)	670	16	5	723	2330	667
Heavy Vehicles (%)	3%	3%	100%	4%	2%	2%
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	3	3	4	2	2
Permitted Phases	4	3	3	4	2	2
Actuated Green, G (s)	28.0	28.0	37.0	42.0	68.0	82.0
Effective Green, g (s)	30.0	30.0	41.0	44.0	70.0	84.0
Actuated g/C Ratio	0.25	0.25	0.34	0.37	0.58	0.70
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	736	353	106	1145	2620	998
v/s Ratio Prot	c0.23	0.00	0.23	c0.52	c0.47	
v/s Ratio Perm	0.01	0.01	0.01	0.01	0.01	0.01
v/c Ratio	0.91	0.04	0.05	0.63	0.89	0.67
Uniform Delay, d1	43.7	34.1	27.7	31.3	21.6	10.2
Progression Factor	1.27	1.49	1.00	1.00	1.26	1.31
Incremental Delay, d2	16.9	0.2	0.2	1.1	0.5	0.2
Delay (s)	72.5	51.0	27.9	32.5	27.8	13.5
Level of Service	E	D	C	C	C	B
Approach Delay (s)	71.8			32.4	24.6	
Approach LOS	E			C	C	
Intersection Summary						
HCM Average Control Delay	33.2					
HCM Volume to Capacity ratio	0.86					
Actuated Cycle Length (s)	120.0					
Intersection Capacity Utilization	73.8%					
Analysis Period (min)	15					
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis 2010 Baseline Conditions - AM Peak Hour  
5: Mercer St & 1st Avenue

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4↑	4↑					↑	↑		↑	↑	↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0					3.0	3.0		3.0	3.0	
Lane Util. Factor	0.95	0.95					1.00	0.95		1.00	0.95	
Fit	1.00	1.00					1.00	0.94		1.00	0.94	
Fit Protected	1.00	1.00					0.95	1.00		1.00	0.95	
Satd. Flow (prot)	3298	3298					1641	2875		1641	2875	
Fit Permitted	1.00	1.00					0.95	1.00		1.00	0.95	
Satd. Flow (perm)	3298	3298					1641	2875		1641	2875	
Volume (vph)	40	130	0	0	0	0	70	190	120	0	0	0
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	42	1177	0	0	0	0	73	198	125	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	50	0	0	0	0
Lane Group Flow (vph)	0	1219	0	0	0	0	73	273	0	0	0	0
Heavy Vehicles (%)	3%	3%	3%	0%	0%	0%	10%	10%	10%	0%	0%	0%
Parking (#/hr)	3	3					8	8	8			
Turn Type	Perm	Perm					Perm	Perm	Perm			
Protected Phases	1	1					2	2	2			
Permitted Phases	1	1					2	2	2			
Actuated Green, G (s)	46.0	46.0					26.0	26.0	26.0			
Effective Green, g (s)	47.0	47.0					27.0	27.0	27.0			
Actuated g/C Ratio	0.59	0.59					0.34	0.34	0.34			
Clearance Time (s)	4.0	4.0					4.0	4.0	4.0			
Lane Grp Cap (vph)	1938	1938					554	970	554			
v/s Ratio Prot							c0.09					
v/s Ratio Perm	0.37	0.37					0.04					
v/c Ratio	0.63	0.63					0.13	0.28	0.13			
Uniform Delay, d1	10.8	10.8					18.4	19.4	18.4			
Progression Factor	1.00	1.00					1.00	1.00	1.00			
Incremental Delay, d2	1.6	1.6					0.5	0.7	0.5			
Delay (s)	12.4	12.4					18.9	20.1	18.9			
Level of Service	B	B					B	C	B			
Approach Delay (s)	12.4	12.4					0.0	19.9	0.0			
Approach LOS	B	B					A	B	A			
Intersection Summary												
HCM Average Control Delay	14.2	14.2					HCM Level of Service		B			
HCM Volume to Capacity ratio	0.50	0.50										
Actuated Cycle Length (s)	80.0	80.0					Sum of lost time (s)		6.0			
Intersection Capacity Utilization	54.1%	54.1%					ICU Level of Service		A			
Analysis Period (min)	15	15										
c Critical Lane Group												

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HCM Signalized Intersection Capacity Analysis 2010 Baseline Conditions - AM Peak Hour  
6: Mercer St & 5th Ave

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4↑	4↑					↑	↑		↑	↑	↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	11	12	12	12	11	11	11	11	11	12
Total Lost time (s)	3.0	3.0					3.0	3.0	3.0	3.0	3.0	
Lane Util. Factor	0.86	1.00					0.91	0.91	0.91	0.91	0.91	
Fit Protected	1.00	0.87					1.00	0.92	1.00	1.00	0.91	
Fit Permitted	1.00	1.00					1.00	1.00	1.00	1.00	1.00	
Satd. Flow (prot)	1000	1000					1000	0.85	1000	1000	0.99	
Fit Permitted	1.00	1.00					1.00	1.00	1.00	1.00	0.99	
Satd. Flow (perm)	1000	1000					1000	0.85	1000	1000	0.99	
Volume (vph)	15	1125	160	0	0	0	550	230	95	190	0	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	16	1184	168	0	0	0	579	242	100	200	0	0
RTOR Reduction (vph)	0	0	37	0	0	0	0	150	0	0	0	0
Lane Group Flow (vph)	0	1200	131	0	0	0	579	92	69	231	0	0
Heavy Vehicles (%)	4%	4%	4%	0%	0%	0%	5%	5%	5%	5%	5%	5%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)	25	25					18	0	0	18	0	8
Turn Type	Perm	Perm	Perm				Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	2	2					8	8	7	4		
Permitted Phases	2	2					8	8	4	4		
Actuated Green, G (s)	43.0	43.0					50.0	50.0	85.0	85.0		
Effective Green, g (s)	46.0	46.0					53.0	53.0	88.0	88.0		
Actuated g/C Ratio	0.33	0.33					0.38	0.38	0.63	0.63		
Clearance Time (s)	6.0	6.0					6.0	6.0	6.0	6.0		
Lane Grp Cap (vph)	1880	428					1162	471	540	1643		
v/s Ratio Prot							c0.19		0.03	0.03		
v/s Ratio Perm	0.21	0.10					0.07	0.05	0.06	0.06		
v/c Ratio	0.64	0.31					0.50	0.19	0.13	0.14		
Uniform Delay, d1	39.9	35.1					33.3	29.2	18.2	10.6		
Progression Factor	1.00	1.00					1.10	2.99	2.41	2.32		
Incremental Delay, d2	1.7	1.8					1.5	0.9	0.4	0.1		
Delay (s)	41.6	36.9					38.3	88.1	44.2	24.7		
Level of Service	D	D					D	F	D	C		
Approach Delay (s)	41.0	41.0					0.0	53.0	29.2	29.2		
Approach LOS	D	D					A	D	C	C		
Intersection Summary												
HCM Average Control Delay	43.5	43.5					HCM Level of Service		D			
HCM Volume to Capacity ratio	0.45	0.45										
Actuated Cycle Length (s)	140.0	140.0					Sum of lost time (s)		6.0			
Intersection Capacity Utilization	58.6%	58.6%					ICU Level of Service		B			
Analysis Period (min)	15	15										
c Critical Lane Group												

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HCM Signalized Intersection Capacity Analysis 2010 Baseline Conditions - AM Peak Hour  
7: Mercer St & Dexter Avenue 500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBR	NBT	NBR	SBL	SBT	NEL	NER	NER2
Lane Configurations	4T1P										
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	10	11	10	12	12	12	12
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.86	1.00	0.95	1.00	1.00	1.00	0.95	1.00	0.95	1.00	0.95
Flt	0.99	0.86	1.00	0.85	1.00	1.00	1.00	0.87	0.85	1.00	0.85
Fit Protected	1.00	1.00	1.00	1.00	0.95	1.00	0.95	1.00	0.99	1.00	1.00
Satd. Flow (prot)	5688	1382	2861	1326	1501	3217	1438	1341	1341	1341	1341
Flt Permitted	1.00	1.00	1.00	1.00	0.51	1.00	0.51	1.00	0.99	1.00	1.00
Satd. Flow (perm)	5688	1382	2861	1326	809	3217	1438	1341	1341	1341	1341
Volume (vph)	120	1615	130	35	175	60	235	550	25	275	5
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	136	1835	148	40	199	68	267	625	28	312	6
RTOR Reduction (vph)	0	0	0	22	0	34	0	0	0	1	0
Lane Group Flow (vph)	0	2119	0	18	199	34	267	625	186	159	0
Heavy Vehicles (%)	2%	2%	2%	7%	6%	6%	1%	1%	3%	3%	3%
Turn Type	Perm	1	custom	1	4	3	7	2	2	2	2
Protected Phases	1	1	4	4	7						
Permitted Phases	1	1	4	4	7						
Actuated Green, G (s)	60.0	60.0	30.0	30.0	48.0	48.0	14.0	14.0	14.0	14.0	14.0
Effective Green, g (s)	63.0	63.0	33.0	33.0	51.0	51.0	17.0	17.0	17.0	17.0	17.0
Actuated g/C Ratio	0.45	0.45	0.24	0.24	0.36	0.36	0.12	0.12	0.12	0.12	0.12
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lane Grp Cap (vph)	2560	622	674	313	369	1172	175	163			
v/s Ratio Prot		0.01	0.07		c0.08	0.19	c0.13	0.12			
v/s Ratio Perm	0.37		0.03	c0.19							
v/c Ratio	0.83	0.03	0.30	0.11	0.72	0.53	1.06	0.98			
Uniform Delay, d1	33.7	21.5	43.9	42.0	36.1	35.1	61.5	61.3			
Progression Factor	0.84	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Incremental Delay, d2	3.1	0.1	1.1	0.7	11.7	1.7	85.7	64.5			
Delay (s)	31.5	21.5	45.1	42.6	47.8	36.9	147.2	125.8			
Level of Service	C	C	D	D	D	D	D	F	F	F	F
Approach Delay (s)	31.5		44.4		40.1	137.3					
Approach LOS	C		D		D	F					
Intersection Summary											
HCM Average Control Delay	44.4				HCM Level of Service				D		
HCM Volume to Capacity ratio	0.82				Sum of lost time (s)				9.0		
Actuated Cycle Length (s)	140.0				ICU Level of Service				D		
Intersection Capacity Utilization	76.9%				Analysis Period (min)				15		
Analysis Period (min)	15				Critical Lane Group				c		

HCM Signalized Intersection Capacity Analysis 2010 Baseline Conditions - AM Peak Hour  
8: Mercer St & 9th Ave 500 Fifth Avenue North

Movement	EBT	EBR	SBL	SBT	SBR	SER
Lane Configurations	1T1P		1	4T		1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	9	12	11
Total Lost time (s)	3.0		3.0	3.0		
Lane Util. Factor	0.86		0.91	0.91		
Fltb, ped/bikes	1.00		1.00	1.00		
Flpb, ped/bikes	1.00		0.88	0.99		
Flt	0.99		1.00	0.99		
Flt Protected	1.00		0.95	1.00		
Satd. Flow (prot)	5538		1251	2625		
Flt Permitted	1.00		0.95	1.00		
Satd. Flow (perm)	5538		1251	2625		
Volume (vph)	1945	90	465	710	30	0
Peak-hour factor: PHF	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	2091	97	500	763	32	0
RTOR Reduction (vph)	5	0	7	7	0	0
Lane Group Flow (vph)	2183	0	409	872	0	0
Confl. Peds. (#/hr)			50			
Heavy Vehicles (%)	2%	2%	4%	4%	4%	0%
Bus Blockages (#/hr)	0	0	0	2	0	0
Turn Type			Perm		custom	
Protected Phases	1			2!		2!
Permitted Phases				2		
Actuated Green, G (s)	70.5		38.5	38.5		
Effective Green, g (s)	73.0		41.0	41.0		
Actuated g/C Ratio	0.61		0.34	0.34		
Clearance Time (s)	5.5		5.5	5.5		
Vehicle Extension (s)	3.0		3.0	3.0		
Lane Grp Cap (vph)	3369		427	897		
v/s Ratio Prot	c0.39					
v/s Ratio Perm			0.33	0.33		
w/C Ratio	0.65		0.96	0.97		
Uniform Delay, d1	15.2		38.7	38.9		
Progression Factor	1.00		0.66	0.67		
Incremental Delay, d2	1.0		26.1	18.7		
Delay (s)	16.2		51.6	44.8		
Level of Service	B		D	D		
Approach Delay (s)	16.2			47.0		
Approach LOS	B			D		
Intersection Summary						
HCM Average Control Delay	27.6			HCM Level of Service		
HCM Volume to Capacity ratio	0.76			C		
Actuated Cycle Length (s)	120.0			Sum of lost time (s)		
Intersection Capacity Utilization	64.9%			ICU Level of Service		
Analysis Period (min)	15			C		
! Phase conflict between lane groups.						
c Critical Lane Group						



HCM Signalized Intersection Capacity Analysis 2010 Baseline Conditions - AM Peak Hour  
9: Mercer St & Westlake Ave 500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR	SBT	SBR
Lane Configurations	4T1T												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	12	12	12	12	12	11	12	12	12	12	12
Total Lost time (s)	3.0												
Lane Util. Factor	0.86												
Fit	1.00												
Fit Protected	0.99												
Satd. Flow (prot)	5534												
Fit Permitted	0.99												
Satd. Flow (perm)	5534												
Volume (vph)	285	2480	40	0	0	0	0	340	105	155	250	0	0
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	297	2582	42	0	0	0	0	354	109	161	260	0	0
RTOR Reduction (vph)	0	2	0	0	0	0	0	0	42	0	0	0	0
Lane Group Flow (vph)	0	2899	0	0	0	0	0	354	67	161	260	0	0
Heavy Vehicles (%)	2%	2%	2%	0%	0%	0%	0%	4%	4%	4%	0%	0%	0%
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4							6			5		2
Permitted Phases	4							6			5		2
Actuated Green, G (s)	69.8							18.9	18.9	13.8	39.2		
Effective Green, g (s)	72.3							21.9	21.9	16.8	41.7		
Actuated g/C Ratio	0.60							0.18	0.18	0.14	0.35		
Clearance Time (s)	5.5							6.0	6.0	6.0	5.5		
Vehicle Extension (s)	3.0							3.0	3.0	3.0	3.0		
Lane Grp Cap (vph)	3334							528	232	227	594		
v/s Ratio Prot								c0.12		c0.10	0.15		
v/s Ratio Perm	0.52								0.05				
v/c Ratio	0.87							0.67	0.29	0.71	0.44		
Uniform Delay, d1	19.9							45.7	42.3	49.3	30.1		
Progression Factor	0.71							0.90	0.83	0.86	0.73		
Incremental Delay, d2	2.7							3.3	0.7	8.8	0.5		
Delay (s)	16.7							44.6	36.0	51.0	22.6		
Level of Service	B							D	D	D	C		
Approach Delay (s)	16.7							42.6			33.4		
Approach LOS	B							D			C		
Intersection Summary													
HCM Average Control Delay	21.7												
HCM Volume to Capacity ratio	0.81												
Actuated Cycle Length (s)	120.0												
Intersection Capacity Utilization	76.4%												
Analysis Period (min)	15												
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis 2010 Baseline Conditions - AM Peak Hour  
10: Mercer St & Fairview Ave 500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR	SBT	SBR
Lane Configurations	4T1T												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	12	12	12	12	12	10	12	12	12	12	12
Total Lost time (s)	3.0												
Lane Util. Factor	0.91												
Fit	1.00												
Fit Protected	1.00												
Satd. Flow (prot)	4423												
Fit Permitted	1.00												
Satd. Flow (perm)	4423												
Volume (vph)	10	2015	375	140	1385	2605	245	335	10	30			
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	10	2077	387	144	1428	2686	253	345	10	31			
RTOR Reduction (vph)	0	0	11	0	0	82	0	1	0	0			
Lane Group Flow (vph)	0	2087	520	0	1428	2604	253	354	0	31			
Heavy Vehicles (%)	2%	2%	2%	2%	1%	1%	3%	3%	3%	21%			
Turn Type	Split	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	11	1	1	2	12	1	2	3	2	3			
Permitted Phases													
Actuated Green, G (s)	45.5												
Effective Green, g (s)	48.0												
Actuated g/C Ratio	0.40												
Clearance Time (s)	5.5												
Vehicle Extension (s)	3.0												
Lane Grp Cap (vph)	1769												
v/s Ratio Prot	0.47												
v/s Ratio Perm	1.18												
v/c Ratio	36.0												
Uniform Delay, d1	0.78												
Progression Factor	86.0												
Incremental Delay, d2	113.9												
Delay (s)	99.8												
Level of Service	F												
Approach Delay (s)	99.8												
Approach LOS	F												
Intersection Summary													
HCM Average Control Delay	144.9												
HCM Volume to Capacity ratio	1.25												
Actuated Cycle Length (s)	120.0												
Intersection Capacity Utilization	169.1%												
Analysis Period (min)	15												
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis 2010 Baseline Conditions - AM Peak Hour  
11: Republican St & 5th Ave 500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	11	11	11	12	11	11	12
Total Lost time (s)	3.0			3.0			3.0			3.0		
Lane Util. Factor	0.95			0.95			1.00			0.91		
Frpb, ped/bikes	1.00			0.97			1.00			1.00		
Flpb, ped/bikes	0.98			1.00			0.74			1.00		
Fit	1.00			0.85			1.00			1.00		
Fit Protected	0.98			1.00			0.95			1.00		
Satd. Flow (prot)	1253			1079			1209			4685		
Fit Permitted	0.98			1.00			0.56			1.00		
Satd. Flow (perm)	1253			1079			709			4685		
Volume (vph)	0	0	0	5	5	5	15	730	15	10	310	5
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	0	0	0	5	5	5	15	745	15	10	316	5
RTOR Reduction (vph)	0	0	0	0	0	4	0	1	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	10	1	15	759	0	10	321	0
Confl. Peds. (#/hr)	10	20	20	10	75	20	20	20	20	75	20	20
Heavy Vehicles (%)	0%	0%	0%	33%	33%	33%	7%	7%	7%	7%	7%	7%
Parking (#/hr)	8											
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases	6			6			8			4		
Permitted Phases	6			6			8			4		
Actuated Green, G (s)	20.0			20.0			109.0			109.0		
Effective Green, g (s)	22.0			22.0			112.0			112.0		
Actuated g/C Ratio	0.16			0.16			0.80			0.80		
Clearance Time (s)	5.0			5.0			6.0			6.0		
Vehicle Extension (s)	3.0			3.0			3.0			3.0		
Lane Grp Cap (vph)	197			170			567			3732		
v/s Ratio Prot	0.01			0.00			0.02			0.02		
v/s Ratio Perm	0.05			0.00			0.03			0.20		
Uniform Delay, d1	50.1			49.8			2.9			3.3		
Progression Factor	1.00			1.00			2.89			3.20		
Incremental Delay, d2	0.1			0.0			0.1			0.1		
Delay (s)	50.2			49.8			8.3			10.8		
Level of Service	D			D			A			B		
Approach Delay (s)	50.0			50.1			10.8			3.8		
Approach LOS	A			D			B			A		
Intersection Summary												
HCM Average Control Delay	9.2			HCM Level of Service			A					
HCM Volume to Capacity ratio	0.18											
Actuated Cycle Length (s)	140.0			Sum of lost time (s)								
Intersection Capacity Utilization	30.0%			6.0								
Analysis Period (min)	15			ICU Level of Service								
Critical Lane Group												

HCM Signalized Intersection Capacity Analysis 2010 Baseline Conditions - AM Peak Hour  
12: Harrison St & 5th Ave 500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↵ ↵											



# HCM Unsignalized Intersection Capacity Analysis 2010 Baseline Conditions - AM Peak Hour 13: Harrison St & Broad St 500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Sign Control												
Grade												
Volume (veh/h)	0	0	5	0	0	0	0	0	315	5	0	1220
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Hourly flow rate (vph)	0	0	6	0	0	0	0	0	354	6	0	1371
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type												
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume												
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1807	1989	944	1042	2225	180	1868					360
IC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1					4.1
IC, 2 stage (s)												
IF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2					2.2
p0 queue free %	100	100	98	100	100	100	100					100
cM capacity (veh/h)	49	61	263	180	43	838	318					1196
Direction: Lane #												
Volume Total	6	0	236	124	914	934						
Volume Left	0	0	0	0	0	0						
Volume Right	6	0	0	6	0	478						
cSH	263	1700	1700	1700	1700	1700						
Volume to Capacity	0.02	0.00	0.14	0.07	0.54	0.55						
Queue Length 95th (ft)	2	0	0	0	0	0						
Control Delay (s)	19.0	0.0	0.0	0.0	0.0	0.0						
Lane LOS	C	A										
Approach Delay (s)	19.0	0.0	0.0	0.0	0.0	0.0						
Approach LOS	C	A										
Intersection Summary												
Average Delay												
Intersection Capacity Utilization												
Analysis Period (min)												

# HCM Signalized Intersection Capacity Analysis 2010 Baseline Conditions - AM Peak Hour 14: 5th Ave & Broad St 500 Fifth Avenue North

Movement	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	12	12	11	11	11	11	12	11	11	12
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	1.00	0.95	1.00
Frpb, ped/bikes	0.97	1.00	0.75	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.98	1.00	0.85	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Permitted	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3103	3298	1150	1586	3172	1631	3298	3172	1631	3298	3172	1631
Satd. Flow (perm)	3103	3298	1150	1586	3172	1631	3298	3172	1631	3298	3172	1631
Volume (vph)	0	185	30	0	315	75	65	285	0	95	1090	5
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	0	187	30	0	318	76	66	288	0	96	1101	5
RTOR, Reduction (vph)	0	9	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	208	0	0	318	76	66	288	0	96	1106	0
Confli. Peds. (#/hr)	115	85	85	115	130	45	45	130	85	85	115	130
Heavy Vehicles (%)	3%	3%	3%	2%	2%	2%	10%	10%	10%	7%	7%	7%
Bus Blockages (#/hr)	0	20	0	0	18	0	0	0	0	0	0	0
Turn Type												
Protected Phases												
Permitted Phases												
Actuated Green, G (s)	43.0	43.0	43.0	29.0	47.0	29.0	47.0	29.0	47.0	29.0	47.0	29.0
Effective Green, g (s)	49.0	49.0	49.0	32.0	50.0	32.0	50.0	32.0	50.0	32.0	50.0	32.0
Actuated g/C Ratio	0.35	0.35	0.35	0.23	0.36	0.23	0.36	0.23	0.36	0.23	0.36	0.23
Clearance Time (s)	9.0	9.0	9.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lane Grp Cap (vph)	1086	1154	403	363	1133	373	1163	373	1163	373	1163	373
v/s Ratio Prot	0.07	c0.10	0.04	0.04	0.09	c0.06	c0.34	0.06	c0.34	0.06	c0.34	0.06
v/s Ratio Perm												
v/c Ratio	0.19	0.28	0.19	0.18	0.25	0.26	0.95	0.26	0.95	0.26	0.95	0.26
Uniform Delay, d1	31.7	32.7	31.7	43.5	31.8	44.3	43.8	44.3	43.8	44.3	43.8	44.3
Progression Factor	1.06	1.05	1.06	0.99	0.88	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.4	0.6	1.0	1.1	0.5	1.7	17.0	1.7	17.0	1.7	17.0	1.7
Delay (s)	33.9	34.8	34.6	44.0	28.6	45.9	60.8	45.9	60.8	45.9	60.8	45.9
Level of Service	C	C	C	C	D	C	D	C	D	C	D	E
Approach Delay (s)	33.9	34.8	34.6	44.0	28.6	45.9	60.8	45.9	60.8	45.9	60.8	45.9
Approach LOS	C	C	C	C	D	C	D	C	D	C	D	E
Intersection Summary												
HCM Average Control Delay												
HCM Volume to Capacity ratio												
Actuated Cycle Length (s)												
Intersection Capacity Utilization												
Analysis Period (min)												
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis 2010 Baseline Conditions - AM Peak Hour  
15: Denny Way & 1st Avenue 500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SBL	SBR	NWL	NWR
Lane Configurations	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Flt	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Flt Protected	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	3443	3443	3443	3443	3443	3443	3443	3443	3443	3443
Flt Permitted	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (perm)	3443	3443	3443	3443	3443	3443	3443	3443	3443	3443
Volume (vph)	0	1915	255	0	930	320	0	0	160	10
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	0	1974	263	0	959	330	0	0	165	10
RTOR Reduction (vph)	0	10	0	0	62	0	0	0	0	0
Lane Group Flow (vph)	0	2227	0	0	1227	0	0	0	165	10
Heavy Vehicles (%)	3%	3%	3%	4%	4%	4%	0%	0%	11%	11%
Parking (#/hr)	0	0	0	0	0	0	0	0	0	0
Turn Type	1	1	1	1	1	1	1	1	1	1
Protected Phases	1	1	1	1	1	1	1	1	1	1
Permitted Phases	1	1	1	1	1	1	1	1	1	1
Actuated Green, G (s)	69.0	69.0	69.0	69.0	69.0	69.0	69.0	69.0	69.0	69.0
Effective Green, g (s)	71.0	71.0	71.0	71.0	71.0	71.0	71.0	71.0	71.0	71.0
Actuated g/C Ratio	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lane Grp Cap (vph)	2445	3405	3405	3405	3405	3405	3405	3405	3405	3405
v/s Ratio Prot	0.65	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26
v/s Ratio Perm	0.91	0.36	0.36	0.36	0.36	0.36	0.36	0.36	0.36	0.36
Uniform Delay, d1	11.9	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7
Progression Factor	1.00	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Incremental Delay, d2	6.5	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Delay (s)	18.4	5.6	5.6	5.6	5.6	5.6	5.6	5.6	5.6	5.6
Level of Service	B	A	A	A	A	A	A	A	A	A
Approach Delay (s)	18.4	5.6	5.6	5.6	5.6	5.6	5.6	5.6	5.6	5.6
Approach LOS	B	A	A	A	A	A	A	A	A	A
Intersection Summary										
HCM Average Control Delay	14.8	5.6	5.6	5.6	5.6	5.6	5.6	5.6	5.6	5.6
HCM Volume to Capacity ratio	0.81	0.36	0.36	0.36	0.36	0.36	0.36	0.36	0.36	0.36
Actuated Cycle Length (s)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Intersection Capacity Utilization	83.6%	83.6%	83.6%	83.6%	83.6%	83.6%	83.6%	83.6%	83.6%	83.6%
Analysis Period (min)	15	15	15	15	15	15	15	15	15	15
c Critical Lane Group										

HCM Signalized Intersection Capacity Analysis 2010 Baseline Conditions - AM Peak Hour  
16: Denny Way & Broad St 500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NER	NWL	NWR
Lane Configurations	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Flt	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Flt Protected	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	3358	3358	3358	3358	3358	3358	3358	3358	3358	3358
Flt Permitted	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (perm)	3358	3358	3358	3358	3358	3358	3358	3358	3358	3358
Volume (vph)	0	1110	5	5	985	5	0	295	35	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	1168	5	5	1037	5	0	311	37	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	1173	0	0	1047	0	0	339	0	0
Heavy Vehicles (%)	3%	3%	3%	4%	4%	4%	5%	5%	5%	2%
Bus Blockages (#/hr)	0	4	0	0	10	0	0	0	0	0
Turn Type	1	1	1	1	1	1	1	1	1	1
Protected Phases	1	1	1	1	1	1	1	1	1	1
Permitted Phases	1	1	1	1	1	1	1	1	1	1
Actuated Green, G (s)	53.0	53.0	53.0	53.0	53.0	53.0	53.0	53.0	53.0	53.0
Effective Green, g (s)	55.0	55.0	55.0	55.0	55.0	55.0	55.0	55.0	55.0	55.0
Actuated g/C Ratio	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lane Grp Cap (vph)	1847	1847	1847	1847	1847	1847	1847	1847	1847	1847
v/s Ratio Prot	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35
v/s Ratio Perm	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63
Uniform Delay, d1	15.6	15.6	15.6	15.6	15.6	15.6	15.6	15.6	15.6	15.6
Progression Factor	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52
Incremental Delay, d2	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
Delay (s)	8.8	8.8	8.8	8.8	8.8	8.8	8.8	8.8	8.8	8.8
Level of Service	A	A	A	A	A	A	A	A	A	A
Approach Delay (s)	8.8	8.8	8.8	8.8	8.8	8.8	8.8	8.8	8.8	8.8
Approach LOS	A	A	A	A	A	A	A	A	A	A
Intersection Summary										
HCM Average Control Delay	20.4	20.4	20.4	20.4	20.4	20.4	20.4	20.4	20.4	20.4
HCM Volume to Capacity ratio	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76
Actuated Cycle Length (s)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Intersection Capacity Utilization	67.9%	67.9%	67.9%	67.9%	67.9%	67.9%	67.9%	67.9%	67.9%	67.9%
Analysis Period (min)	15	15	15	15	15	15	15	15	15	15
c Critical Lane Group										

HCM Signalized Intersection Capacity Analysis 2010 Baseline Conditions - AM Peak Hour  
17: Denny Way & 5th Ave

Movement	EBL	EBT	EBR	EBR2	WBT	WBR	NBL	NBT	NBR	NBR2	SBL2	SBL
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	12	11	12	12	10	12	12	10	12	12	11	12
Lane Width	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Total Lost time (s)	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Lane Util. Factor	0.99	0.99	0.99	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Flt Protected	3174	3145	3145	2897	2897	2897	2897	2897	2897	2897	2897	2897
Satd. Flow (prot)	3022	3145	3145	2897	2897	2897	2897	2897	2897	2897	2897	2897
Flt Permitted	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (perm)	3022	3145	3145	2897	2897	2897	2897	2897	2897	2897	2897	2897
Volume (vph)	5	710	370	10	755	115	5	60	15	15	55	200
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	5	747	389	11	795	121	5	63	16	16	58	211
RTOR Reduction (vph)	0	0	0	0	10	0	0	15	0	0	0	0
Lane Group Flow (vph)	0	1152	0	0	906	0	0	85	0	0	0	269
Conf. Peds. (#/hr)	23	8	8	23	17	17	17	17	17	17	17	17
Heavy Vehicles (%)	2%	2%	2%	2%	4%	4%	8%	8%	8%	8%	3%	3%
Bus Blockages (#/hr)	0	4	0	0	2	0	0	11	0	0	0	0
Turn Type	Perm	Perm	Perm	Perm	Split	Split	Split	Split	Split	Split	Split	Split
Protected Phases	1	1	1	1	3	3	3	3	3	3	3	3
Permitted Phases	1	1	1	1	3	3	3	3	3	3	3	3
Actuated Green, G (s)	59.0	59.0	59.0	59.0	7.1	7.1	7.1	7.1	7.1	7.1	7.1	7.1
Effective Green, g (s)	61.0	61.0	61.0	61.0	9.1	9.1	9.1	9.1	9.1	9.1	9.1	9.1
Actuated g/C Ratio	0.61	0.61	0.61	0.61	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1843	1918	1918	1918	264	264	264	264	264	264	264	264
v/s Ratio Prot	0.29	0.29	0.29	0.29	c0.03	c0.03	c0.03	c0.03	c0.03	c0.03	c0.03	c0.03
v/s Ratio Perm	c0.38	c0.38	c0.38	c0.38	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47
v/c Ratio	0.62	0.62	0.62	0.62	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32
Uniform Delay, d1	12.3	12.3	12.3	12.3	10.7	10.7	10.7	10.7	10.7	10.7	10.7	10.7
Progression Factor	0.14	0.14	0.14	0.14	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Incremental Delay, d2	1.4	1.4	1.4	1.4	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
Delay (s)	3.2	3.2	3.2	3.2	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0
Level of Service	A	A	A	A	B	B	B	B	B	B	B	B
Approach Delay (s)	3.2	3.2	3.2	3.2	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0
Approach LOS	A	A	A	A	B	B	B	B	B	B	B	B
Intersection Summary												
HCM Average Control Delay	13.3											
HCM Volume to Capacity ratio	0.62											
Actuated Cycle Length (s)	100.0											
Intersection Capacity Utilization	63.2%											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis 2010 Baseline Conditions - AM Peak Hour  
17: Denny Way & 5th Ave

Movement	SBT	SBR
Lane Configurations	1900	1900
Ideal Flow (vphpl)	13	12
Lane Width	3.0	3.0
Total Lost time (s)	0.99	0.99
Lane Util. Factor	1.00	1.00
Flpb, ped/bikes	1.00	1.00
Flt	0.98	0.98
Flt Protected	1856	1856
Satd. Flow (prot)	1856	1856
Flt Permitted	1.00	1.00
Satd. Flow (perm)	1856	1856
Volume (vph)	95	15
Peak-hour factor, PHF	0.95	0.95
Adj. Flow (vph)	100	16
RTOR Reduction (vph)	6	0
Lane Group Flow (vph)	110	0
Conf. Peds. (#/hr)	17	17
Heavy Vehicles (%)	3%	3%
Bus Blockages (#/hr)	0	0
Turn Type	Prot	Prot
Protected Phases	2	2
Permitted Phases	2	2
Actuated Green, G (s)	18.9	18.9
Effective Green, g (s)	20.9	20.9
Actuated g/C Ratio	0.21	0.21
Clearance Time (s)	5.0	5.0
Vehicle Extension (s)	3.0	3.0
Lane Grp Cap (vph)	388	388
v/s Ratio Prot	0.06	0.06
v/s Ratio Perm	0.28	0.28
v/c Ratio	0.28	0.28
Uniform Delay, d1	33.3	33.3
Progression Factor	1.00	1.00
Incremental Delay, d2	0.4	0.4
Delay (s)	33.7	33.7
Level of Service	C	C
Approach Delay (s)	41.2	41.2
Approach LOS	D	D
Intersection Summary		

HCM Signalized Intersection Capacity Analysis 2010 Baseline Conditions - AM Peak Hour  
18: Denny Way & Aurora Ave 500 Fifth Avenue North

Movement	EBT	EBR	EBR2	WBT	WBR	NBT	NBR	NBR2	SBL2	SBL	SBT	SBR
Lane Configurations	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	11	12	12	12	12	12	12	12	12
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Fit	0.98	0.98	0.98	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Fit Protected	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	3019	2954	2954	3094	3094	3094	3094	3094	3094	3094	3094	3094
Fit Permitted	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (perm)	3019	2954	2954	3094	3094	3094	3094	3094	3094	3094	3094	3094
Volume (vph)	930	135	5	855	145	295	65	5	340	165	0	825
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	979	142	5	900	153	311	68	5	358	174	0	868
RTOR Reduction (vph)	0	0	0	13	0	0	0	0	0	0	0	2
Lane Group Flow (vph)	1126	0	0	1040	0	384	0	0	532	442	0	440
Heavy Vehicles (%)	2%	2%	2%	4%	4%	2%	2%	2%	3%	3%	3%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	4
Turn Type	2	2	2	4	4	4	4	4	3	3	3	8
Protected Phases	2	2	2	4	4	4	4	4	3	3	3	8
Permitted Phases	30.1	30.1	30.1	16.9	16.9	16.9	16.9	16.9	34.0	34.0	34.0	55.9
Actuated Green, G (s)	36.1	36.1	36.1	18.9	18.9	18.9	18.9	18.9	36.0	36.0	36.0	57.9
Effective Green, g (s)	0.36	0.36	0.36	0.19	0.19	0.19	0.19	0.19	0.36	0.36	0.36	0.58
Actuated g/C Ratio	9.0	9.0	9.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Clearance Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Vehicle Extension (s)	1090	1066	1066	585	585	585	585	585	568	568	568	776
Lane Grp Cap (vph)	c0.37	c0.35	c0.35	c0.12	c0.12	c0.12	c0.12	c0.12	c0.34	c0.34	c0.34	0.33
v/s Ratio Prot	1.03	0.98	0.98	0.66	0.66	0.66	0.66	0.66	0.94	0.94	0.94	0.57
v/s Ratio Perm	31.9	31.5	31.5	37.5	37.5	37.5	37.5	37.5	30.9	30.9	30.9	13.2
Uniform Delay, d1	1.16	0.80	0.80	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Progression Factor	35.7	20.3	20.3	2.7	2.7	2.7	2.7	2.7	23.0	23.0	23.0	1.1
Incremental Delay, d2	72.9	39.3	39.3	40.2	40.2	40.2	40.2	40.2	53.9	53.9	53.9	14.2
Delay (s)	E	D	D	D	D	D	D	D	D	D	D	B
Level of Service	E	D	D	D	D	D	D	D	D	D	D	B
Approach Delay (s)	72.9	39.3	39.3	40.2	40.2	40.2	40.2	40.2	53.9	53.9	53.9	29.2
Approach LOS	E	D	D	D	D	D	D	D	D	D	D	C

Intersection Summary			
HCM Average Control Delay	45.3	HCM Level of Service	D
HCM Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	86.2%	ICU Level of Service	E
Analysis Period (min)	15		
Critical Lane Group			

HCM Signalized Intersection Capacity Analysis 2010 Baseline Conditions - AM Peak Hour  
18: Denny Way & Aurora Ave 500 Fifth Avenue North

Movement	SBR2
Lane Configurations	✓
Ideal Flow (vphpl)	1900
Lane Width	12
Total Lost time (s)	
Lane Util. Factor	
Fit	
Fit Protected	
Satd. Flow (prot)	
Fit Permitted	
Satd. Flow (perm)	
Volume (vph)	15
Peak-hour factor, PHF	0.95
Adj. Flow (vph)	16
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Heavy Vehicles (%)	3%
Bus Blockages (#/hr)	0
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	
Intersection Summary	

HCM Signalized Intersection Capacity Analysis 2010 Baseline Conditions - AM Peak Hour  
19: Denny Way & Dexter Avenue 500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4P	4P	4P	4P	4P	4P	4P	4P	4P	4P	4P	4P
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Frt	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	3207	3145	3145	1354	2687	1593	3185	1425				
Flt Permitted	0.83	1.00	1.00	0.44	1.00	0.69	1.00	1.00				
Satd. Flow (perm)	2660	3145	3145	620	2687	1158	3185	1425				
Volume (vph)	65	1185	5	0	815	75	5	85	5	150	295	205
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	71	1288	5	0	886	82	5	92	5	163	321	223
RTOR Reduction (vph)	0	0	0	0	5	0	0	4	0	0	0	172
Lane Group Flow (vph)	0	1364	0	0	963	0	5	93	0	163	321	51
Heavy Vehicles (%)	1%	1%	1%	2%	2%	2%	20%	20%	20%	2%	2%	2%
Turn Type	pm+pt											
Protected Phases	2	5			1			3			3	
Permitted Phases	5				3			3			3	
Actuated Green, G (s)	68.2	51.5	19.8	19.8	51.5	19.8	19.8	51.5	19.8	19.8	51.5	19.8
Effective Green, g (s)	71.2	54.5	22.8	22.8	54.5	22.8	22.8	54.5	22.8	22.8	54.5	22.8
Actuated g/C Ratio	0.71	0.55	0.23	0.23	0.55	0.23	0.23	0.55	0.23	0.23	0.55	0.23
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1969	1714	141	141	1714	141	141	1714	141	141	1714	141
v/s Ratio Prot	c0.09	0.31			0.01			0.03			0.10	
v/s Ratio Perm	c0.40				0.56			0.04			0.62	
v/c Ratio	0.69	0.56	0.04	0.15	0.56	0.04	0.15	0.56	0.04	0.15	0.56	0.04
Uniform Delay, d1	8.2	14.9	30.0	30.9	14.9	30.0	30.9	14.9	30.0	30.9	14.9	30.9
Progression Factor	0.59	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.3	1.3	0.1	0.1	1.3	0.1	0.1	1.3	0.1	0.1	1.3	0.1
Delay (s)	5.1	16.3	30.1	31.0	16.3	30.1	31.0	16.3	30.1	31.0	16.3	31.0
Level of Service	A	B	C	C	B	C	C	B	C	C	B	C
Approach Delay (s)	5.1	16.3			16.3			16.3			16.3	
Approach LOS	A	B			B			B			B	
Intersection Summary												
HCM Average Control Delay	15.9											
HCM Volume to Capacity ratio	0.67											
Actuated Cycle Length (s)	100.0											
Intersection Capacity Utilization	92.3%											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis 2010 Baseline Conditions - AM Peak Hour  
20: Denny Way & Westlake Ave 500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4P	4P	4P	4P	4P	4P	4P	4P	4P	4P	4P	4P
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Frt	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	3063	3063	2956	2956	3210	3210	2956	2956	3210	3210	2956	2956
Flt Permitted	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (perm)	3063	3063	2956	2956	3210	3210	2956	2956	3210	3210	2956	2956
Volume (vph)	0	1350	50	0	880	140	0	280	80	95	110	10
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	1406	52	0	896	146	0	292	83	99	115	10
RTOR Reduction (vph)	0	2	0	0	9	0	0	30	0	0	7	0
Lane Group Flow (vph)	0	1456	0	0	1033	0	0	345	0	99	118	0
Heavy Vehicles (%)	2%	2%	2%	4%	4%	4%	7%	7%	7%	0%	0%	0%
Turn Type												
Protected Phases	1				1			2			2	
Permitted Phases												
Actuated Green, G (s)	71.5	71.5	71.5	71.5	71.5	71.5	71.5	71.5	71.5	71.5	71.5	71.5
Effective Green, g (s)	73.5	73.5	73.5	73.5	73.5	73.5	73.5	73.5	73.5	73.5	73.5	73.5
Actuated g/C Ratio	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	2251	2173	2173	2173	2173	2173	2173	2173	2173	2173	2173	2173
v/s Ratio Prot	c0.48	0.35			0.35			0.12			0.16	
v/s Ratio Perm												
v/c Ratio	0.65	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48
Uniform Delay, d1	6.7	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.5	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
Delay (s)	8.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1
Level of Service	A	A	A	A	A	A	A	A	A	A	A	A
Approach Delay (s)	8.1	6.1			6.1			6.1			6.1	
Approach LOS	A	A			A			A			A	
Intersection Summary												
HCM Average Control Delay	14.5											
HCM Volume to Capacity ratio	0.68											
Actuated Cycle Length (s)	100.0											
Intersection Capacity Utilization	70.5%											
Analysis Period (min)	15											
c Critical Lane Group												



HCM Signalized Intersection Capacity Analysis 2010 Baseline Conditions - AM Peak Hour  
21: Denny Way & Fairview Ave 500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1	1	1	1	1	1	1	1	1	1	1	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	12	11	11	12	9	10	12	10	10	12
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	1.00	0.95	1.00	0.95	0.97	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Flt Protected	1.00	1.00	1.00	0.98	1.00	0.97	1.00	0.95	1.00	0.95	1.00	0.95
Satd. Flow (prot)	1555	3098	1540	3006	2781	2896	1458	2772	1458	2772	1458	2772
Flt Permitted	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	1555	3098	1540	3006	2781	2896	1458	2772	1458	2772	1458	2772
Volume (vph)	140	765	20	40	765	145	335	290	60	100	325	160
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	149	814	21	43	814	154	356	309	64	106	346	170
RTOR Reduction (vph)	0	2	0	0	15	0	0	19	0	0	84	0
Lane Group Flow (vph)	149	833	0	43	953	0	356	354	0	106	452	0
Heavy Vehicles (%)	1%	1%	1%	2%	2%	2%	2%	2%	2%	4%	4%	4%
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	1	6	5	2	3	8	7	4				
Permitted Phases												
Actuated Green, G (s)	11.5	39.7	5.2	33.4	14.6	26.4	8.7	20.5				
Effective Green, g (s)	13.5	41.7	7.2	35.4	16.6	28.4	10.7	22.5				
Actuated g/C Ratio	0.14	0.42	0.07	0.35	0.17	0.28	0.11	0.22				
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0				
Lane Grp Cap (vph)	210	1292	111	1064	462	822	156	624				
v/s Ratio Prot	c0.10	0.27	0.03	c0.32	c0.13	0.12	0.07	c0.16				
v/c Ratio	0.71	0.64	0.39	0.90	0.77	0.43	0.68	0.73				
Uniform Delay, d1	41.4	23.2	44.3	30.6	39.9	29.2	43.0	35.9				
Progression Factor	1.00	1.00	1.16	0.92	1.00	1.00	1.11	0.76				
Incremental Delay, d2	10.5	2.5	1.4	7.6	7.8	0.4	10.1	3.7				
Delay (s)	51.8	25.7	52.8	35.8	47.6	29.6	57.7	31.0				
Level of Service	D	C	D	D	D	C	E	C				
Approach Delay (s)	29.7		36.6		38.4		35.5					
Approach LOS	C		D		D		D					
Intersection Summary												
HCM Average Control Delay			34.7						C			
HCM Volume to Capacity ratio			0.80									
Actuated Cycle Length (s)			100.0						12.0			
Intersection Capacity Utilization			76.9%						D			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis 2010 Baseline Conditions - AM Peak Hour  
22: Denny Way & Stewart St 500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1	1	1	1	1	1	1	1	1	1	1	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	1.00	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	2963	2963	1593	1676	1593	1676	1593	1676	1593	1676	1593	1676
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (perm)	2963	2963	1593	1676	1593	1676	1593	1676	1593	1676	1593	1676
Volume (vph)	0	490	255	545	885	0	0	0	0	0	190	155
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	510	266	568	922	0	0	0	0	0	198	161
RTOR Reduction (vph)	0	34	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	742	0	568	922	0	0	0	0	0	237.9	0
Heavy Vehicles (%)	4%	4%	4%	2%	2%	2%	0%	0%	0%	0%	5%	5%
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	3	2	2	3								
Permitted Phases												
Actuated Green, G (s)	20.5	29.5	54.5									
Effective Green, g (s)	22.0	31.0	56.0									
Actuated g/C Ratio	0.22	0.31	0.56									
Clearance Time (s)	4.5	4.5	4.5									
Vehicle Extension (s)	3.0	3.0	3.0									
Lane Grp Cap (vph)	652	494	939									
v/s Ratio Prot	c0.25	c0.36	0.55									
v/c Ratio	1.14	1.15	0.98									
Uniform Delay, d1	39.0	34.5	21.5									
Progression Factor	0.94	1.00	1.00									
Incremental Delay, d2	79.3	88.7	24.8									
Delay (s)	115.9	123.2	46.4									
Level of Service	F	F	D									
Approach Delay (s)	115.9		75.6									
Approach LOS	F		E									
Intersection Summary												
HCM Average Control Delay		90.7							F			
HCM Volume to Capacity ratio		1.14										
Actuated Cycle Length (s)		100.0							9.0			
Intersection Capacity Utilization		105.2%							G			
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis 2010 Baseline Conditions - AM Peak Hour  
23: Yale St & Stewart St 500 Fifth Avenue North

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations		↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fit	1.00	0.85	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fit Protected	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1660	1411	1624	1710	1710	1710	1710	1710	1710	1562	1489	1710
Fit Permitted	1.00	1.00	0.42	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1660	1411	719	1710	1710	1710	1710	1710	1710	1562	1489	1710
Volume (vph)	0	205	45	30	10	0	0	0	0	570	1930	0
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	0	209	46	31	10	0	0	0	0	582	1969	0
RTOR Reduction (vph)	0	0	21	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	209	25	31	10	0	0	0	0	582	1969	0
Heavy Vehicles (%)	3%	3%	3%	0%	0%	0%	0%	0%	0%	4%	4%	4%
Turn Type		Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	3	3	3	3	3	3	3	3	3	3	3	3
Permitted Phases	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	70.5	70.5	70.5
Actuated Green, G (s)	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	72.0	72.0	72.0
Effective Green, g (s)	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.72	0.72	0.72
Actuated g/C Ratio	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Clearance Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Vehicle Extension (s)	365	310	158	376	376	376	376	376	376	1125	3232	376
Lane Grp Cap (vph)	c0.13	0.02	0.04	0.01	0.01	0.01	0.01	0.01	0.01	c0.44	c0.44	c0.44
v/s Ratio Prot	0.57	0.08	0.20	0.03	0.03	0.03	0.03	0.03	0.03	0.37	0.52	0.61
v/s Ratio Perm	34.8	31.0	31.8	30.6	30.6	30.6	30.6	30.6	30.6	6.2	7.0	7.0
Uniform Delay, d1	0.93	1.12	0.33	0.30	0.30	0.30	0.30	0.30	0.30	0.29	0.30	0.30
Progression Factor	1.8	0.1	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.1	0.1
Incremental Delay, d2	34.4	34.9	11.2	9.3	9.3	9.3	9.3	9.3	9.3	2.0	2.2	2.2
Delay (s)	C	C	C	B	A	A	A	A	A	A	A	A
Level of Service	C	C	C	B	A	A	A	A	A	A	A	A
Approach Delay (s)	34.4	10.7	10.7	10.7	10.7	10.7	10.7	10.7	10.7	2.2	2.2	2.2
Approach LOS	C	B	B	B	B	B	B	B	B	A	A	A
Intersection Summary												
HCM Average Control Delay	5.2	HCM Level of Service										
HCM Volume to Capacity ratio	0.60	A										
Actuated Cycle Length (s)	100.0	Sum of lost time (s)										
Intersection Capacity Utilization	66.8%	ICU Level of Service										
Analysis Period (min)	15	C										
Critical Lane Group												

HCM Signalized Intersection Capacity Analysis 2010 Baseline Conditions - AM Peak Hour  
24: Yale St & Howell St 500 Fifth Avenue North

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations	4A 7 7 7 7 7 7 7 7 7 7 7											
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0						3.0	3.0	3.0	3.0	
Lane Util. Factor	1.00	1.00						0.95	1.00	1.00	1.00	
Fit	1.00	1.00						1.00	0.85	1.00	1.00	
Fit Protected	0.95	1.00						0.99	1.00	1.00	1.00	
Satd. Flow (prot)	1593	1334						2779	1253	1690	1690	
Fit Permitted	0.95	1.00						0.80	1.00	1.00	1.00	
Satd. Flow (perm)	1593	1334						2247	1253	1690	1690	
Volume (vph)	15	725	25	0	0	0	35	190	430	0	360	5
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	17	843	29	0	0	0	41	221	500	0	419	6
RTOR Reduction (vph)	0	1	0	0	0	0	0	0	88	0	1	0
Lane Group Flow (vph)	17	871	0	0	0	0	0	262	412	0	424	0
Heavy Vehicles (%)	2%	2%	2%	0%	0%	0%	0%	16%	16%	1%	1%	1%
Parking (#/hr)	20											
Turn Type	Split							Perm	1	1	1	1
Protected Phases	2	2						1				
Permitted Phases												
Actuated Green, G(s)	53.0	53.0						37.0	37.0		37.0	
Effective Green, g(s)	55.0	55.0						39.0	39.0		39.0	
Actuated g/C Ratio	0.55	0.55						0.39	0.39		0.39	
Clearance Time (s)	5.0	5.0						5.0	5.0		5.0	
Vehicle Extension (s)	3.0	3.0						3.0	3.0		3.0	
Lane Grp Cap (vph)	876	734						876	489		659	
v/s Ratio Prot	0.01	c0.65						0.12	0.33		0.25	
v/s Ratio Perm												
v/c Ratio	0.02	1.19						0.30	0.84		0.64	
Uniform Delay, d1	10.2	22.5						21.1	27.7		24.8	
Progression Factor	0.62	0.73						1.00	1.00		1.00	
Incremental Delay, d2	0.0	96.0						0.9	18.0		4.8	
Delay (s)	6.4	112.5						21.9	43.7		29.6	
Level of Service	A	F						C	D		C	
Approach Delay (s)	110.5	F						36.2			29.6	
Approach LOS	F	F						D			C	
Intersection Summary												
HCM Average Control Delay	66.7	HCM Level of Service										
HCM Volume to Capacity ratio	1.04	E										
Actuated Cycle Length (s)	100.0	Sum of lost time (s)										
Intersection Capacity Utilization	85.3%	ICU Level of Service										
Analysis Period (min)	15	E										
Critical Lane Group												

HCM Signalized Intersection Capacity Analysis 2010 Baseline Conditions - PM Peak Hour  
1: Roy St & 5th Ave 500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	12	12	12	12	12	12	12	12	12	12	12	12
Lane Width	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Total Lost time (s)	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00
Lane Util. Factor	1.00	0.99	0.99	1.00	0.99	0.99	1.00	0.99	0.99	1.00	0.99	1.00
Frpb, ped/bikes	0.99	1.00	1.00	0.99	1.00	1.00	0.99	1.00	0.99	1.00	0.99	1.00
Flpb, ped/bikes	0.99	1.00	1.00	0.99	1.00	1.00	0.99	1.00	0.99	1.00	0.99	1.00
Fit Protected	0.98	0.95	0.95	0.99	0.95	0.95	0.99	0.95	0.95	0.99	0.95	0.99
Satd. Flow (prot)	1381	1641	1641	1437	1646	1416	1381	1641	1641	1437	1646	1416
Fit Permitted	0.98	0.95	0.95	0.99	0.95	0.95	0.99	0.95	0.95	0.99	0.95	0.99
Satd. Flow (perm)	1381	1641	1641	1437	1646	1416	1381	1641	1641	1437	1646	1416
Volume (vph)	0	0	0	35	55	5	585	320	45	10	185	65
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	38	60	5	636	348	49	11	201	71
RTOR Reduction (vph)	0	0	0	0	2	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	101	0	547	481	0	11	256	0	0
Conf. Peds. (#/hr)	20	20	20	20	20	20	20	20	20	20	20	20
Heavy Vehicles (%)	0%	0%	0%	2%	2%	2%	1%	1%	1%	6%	6%	6%
Parking (#/hr)	20	20	20	20	20	20	20	20	20	20	20	20
Turn Type	Perm	Perm	Perm	Split	Split	Split	Split	Split	Split	Split	Split	Split
Protected Phases	6	6	6	4	4	4	4	4	4	4	4	4
Permitted Phases	6	6	6	4	4	4	4	4	4	4	4	4
Actuated Green, G (s)	17.0	27.0	27.0	27.0	27.0	27.0	27.0	27.0	27.0	27.0	27.0	27.0
Effective Green, g (s)	20.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0
Actuated g/C Ratio	0.25	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lane Grp Cap (vph)	345	615	539	615	539	432	372	615	539	432	372	615
v/s Ratio Prot	0.07	0.33	0.33	0.33	0.33	0.01	0.18	0.33	0.33	0.01	0.18	0.33
v/c Ratio	0.29	0.89	0.89	0.89	0.89	0.03	0.69	0.89	0.89	0.03	0.69	0.89
Uniform Delay, d1	24.3	23.4	23.5	23.4	23.5	21.9	26.5	23.4	23.5	21.9	26.5	23.4
Progression Factor	0.99	0.20	0.20	0.20	0.20	1.00	1.00	0.99	0.20	0.20	0.20	0.99
Incremental Delay, d2	2.1	9.6	11.0	9.6	11.0	0.1	9.9	2.1	9.6	0.1	9.9	2.1
Delay (s)	26.3	14.2	15.6	14.2	15.6	22.0	36.5	26.3	14.2	22.0	36.5	26.3
Level of Service	C	B	B	B	B	C	D	C	B	C	D	C
Approach Delay (s)	0.0	26.3	26.3	26.3	26.3	14.8	35.9	0.0	26.3	14.8	35.9	0.0
Approach LOS	A	C	C	C	C	B	D	A	C	B	D	A
Intersection Summary												
HCM Average Control Delay	19.9											
HCM Volume to Capacity ratio	0.66											
Actuated Cycle Length (s)	80.0											
Intersection Capacity Utilization	61.1%											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis 2010 Baseline Conditions - PM Peak Hour  
2: Broad St & 9th Ave 500 Fifth Avenue North

Movement	EBT	EBR	WBL	WBT	WBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	11	12	10	10	11	12	9	8
Lane Width	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Total Lost time (s)	0.95	1.00	0.95	1.00	0.95	1.00	0.91	1.00
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99	1.00	0.99	1.00	0.99	1.00	1.00
Flpb, ped/bikes	1.00	0.99	1.00	0.99	1.00	0.99	1.00	1.00
Fit Protected	0.93	0.95	0.95	0.99	0.95	0.99	0.99	1.00
Satd. Flow (prot)	2928	1507	2996	3847	1247	2928	1507	2996
Fit Permitted	1.00	0.27	1.00	0.99	1.00	1.00	0.99	1.00
Satd. Flow (perm)	2928	424	2996	3847	1247	2928	424	2996
Volume (vph)	335	275	160	1555	135	140	945	205
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	345	284	165	1603	139	144	974	211
RTOR Reduction (vph)	121	0	0	0	0	0	0	0
Lane Group Flow (vph)	508	0	165	1742	0	0	1118	215
Conf. Peds. (#/hr)	50	50	50	50	50	50	50	50
Heavy Vehicles (%)	0%	0%	0%	0%	0%	1%	1%	1%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0
Parking (#/hr)	20	20	20	20	20	20	20	20
Turn Type	Perm	Perm	Split	Split	Split	Split	Split	Split
Protected Phases	1	2	1	2	3	3	3	3
Permitted Phases	1	2	1	2	3	3	3	3
Actuated Green, G (s)	38.5	63.5	69.5	69.5	38.5	38.5	38.5	38.5
Effective Green, g (s)	41.5	69.5	72.5	72.5	41.5	41.5	41.5	41.5
Actuated g/C Ratio	0.35	0.58	0.60	0.60	0.35	0.35	0.35	0.35
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1013	498	1810	1810	1330	431	1330	431
v/s Ratio Prot	0.17	0.08	0.58	0.58	0.29	0.17	0.29	0.17
v/c Ratio	0.50	0.33	0.96	0.96	0.84	0.50	0.84	0.50
Uniform Delay, d1	31.1	23.7	22.5	22.5	36.2	31.0	36.2	31.0
Progression Factor	1.00	0.29	0.32	0.32	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.8	0.1	6.3	6.3	5.0	0.9	5.0	0.9
Delay (s)	32.8	6.9	13.5	13.5	41.2	32.0	41.2	32.0
Level of Service	C	A	B	B	D	C	D	C
Approach Delay (s)	32.8	13.0	13.0	13.0	39.7	32.8	39.7	32.8
Approach LOS	C	B	B	B	D	C	D	C
Intersection Summary								
HCM Average Control Delay	25.4							
HCM Volume to Capacity ratio	0.92							
Actuated Cycle Length (s)	120.0							
Intersection Capacity Utilization	82.6%							
Analysis Period (min)	15							
c Critical Lane Group								



HCM Signalized Intersection Capacity Analysis 2010 Baseline Conditions - PM Peak Hour  
3: Broad St & Westlake Ave 500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4P	4P	4P	4P	4P	4P	4P	4P	4P	4P	4P	4P
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	12	12	10	12	12	10	12	12	12	12
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	0.95	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	1.00	1.00
Flt Protected	0.98	0.98	1.00	1.00	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	2983	2983	1624	3032	1454	1526	2821	1624	1710	1624	1710	1624
Flt Permitted	0.83	0.43	1.00	1.00	0.45	1.00	0.11	1.00	0.11	1.00	0.11	1.00
Satd. Flow (perm)	2471	734	3032	1454	716	2821	180	1710	180	1710	180	1710
Volume (vph)	15	410	70	80	1730	1045	160	630	425	35	235	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	16	432	74	84	1821	1100	168	663	447	37	247	0
RTOR Reduction (vph)	0	11	0	0	0	25	0	98	0	0	0	0
Lane Group Flow (vph)	0	511	0	84	1821	1075	168	1012	0	37	247	0
Conf. Peds. (#/hr)	1	1	1	1	1	1	1	1	1	1	1	1
Heavy Vehicles (%)	1%	1%	1%	0%	0%	0%	1%	1%	1%	0%	0%	0%
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	2	2	2	2	2	2	2	2	2	2	2	2
Permitted Phases	2	2	2	2	2	2	2	2	2	2	2	2
Actuated Green, G (s)	73.5	73.5	73.5	73.5	73.5	73.5	35.5	35.5	35.5	35.5	35.5	35.5
Effective Green, g (s)	76.0	76.0	76.0	76.0	76.0	76.0	38.0	38.0	38.0	38.0	38.0	38.0
Actuated g/C Ratio	0.63	0.63	0.63	0.63	0.63	0.63	0.32	0.32	0.32	0.32	0.32	0.32
Clearance Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1565	485	1920	921	227	893	57	542	57	542	57	542
v/s Ratio Prot	0.21	0.11	0.11	0.74	0.23	0.36	0.21	0.14	0.21	0.14	0.21	0.14
v/c Ratio	0.33	0.18	0.95	1.17	0.74	1.13	0.65	0.46	0.65	0.46	0.65	0.46
Uniform Delay, d1	10.2	9.1	20.2	22.0	36.6	41.0	35.3	32.7	35.3	32.7	35.3	32.7
Progression Factor	0.63	0.88	0.68	0.68	0.56	0.46	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1	0.1	8.1	8.1	2.0	61.6	45.4	2.7	45.4	2.7	45.4	2.7
Delay (s)	6.5	8.1	21.8	99.1	22.3	80.3	80.6	35.5	80.6	35.5	80.6	35.5
Level of Service	A	A	C	F	C	F	F	D	F	D	F	D
Approach Delay (s)	6.5	49.7	49.7	49.7	49.7	49.7	72.7	41.4	72.7	41.4	72.7	41.4
Approach LOS	A	D	D	D	D	D	E	D	E	D	E	D
Intersection Summary												
HCM Average Control Delay	50.6											
HCM Volume to Capacity ratio	1.16											
Actuated Cycle Length (s)	120.0											
Intersection Capacity Utilization	132.5%											
Analysis Period (min)	15											
c Critical Lane Group												

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HCM Signalized Intersection Capacity Analysis 2010 Baseline Conditions - PM Peak Hour  
4: Valley St & Fairview Ave 500 Fifth Avenue North

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	4P	4P	4P	4P	4P	4P
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	10	12	12	12	12	12
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	1.00	1.00	0.95	0.94	1.00
Flt Protected	1.00	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	3002	1151	812	3217	4536	1439
Flt Permitted	1.00	1.00	0.22	1.00	0.95	1.00
Satd. Flow (perm)	3002	1151	189	3217	4536	1439
Volume (vph)	700	50	5	910	1855	350
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	714	51	5	929	1893	357
RTOR Reduction (vph)	0	12	0	0	0	29
Lane Group Flow (vph)	714	39	5	929	1893	328
Heavy Vehicles (%)	1%	1%	100%	1%	1%	1%
Parking (#/hr)	20	20	20	20	20	20
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	4	4	4	4
Permitted Phases	4	4	4	4	4	4
Actuated Green, G (s)	40.0	40.0	49.0	54.0	56.0	70.0
Effective Green, g (s)	42.0	42.0	53.0	58.0	58.0	72.0
Actuated g/C Ratio	0.35	0.35	0.44	0.47	0.48	0.60
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1051	403	141	1501	2192	863
v/s Ratio Prot	c0.24	c0.24	c0.29	c0.42	c0.23	c0.23
v/c Ratio Perm	0.68	0.10	0.04	0.62	0.86	0.38
Uniform Delay, d1	33.3	26.2	20.1	24.0	27.5	12.4
Progression Factor	1.25	1.42	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.8	0.4	0.1	0.8	0.5	0.0
Delay (s)	44.4	37.7	20.2	24.8	28.0	12.5
Level of Service	D	D	C	C	C	B
Approach Delay (s)	43.9	24.7	25.6	24.7	25.6	24.7
Approach LOS	D	C	C	C	C	C
Intersection Summary						
HCM Average Control Delay	28.9					
HCM Volume to Capacity ratio	0.77					
Actuated Cycle Length (s)	120.0					
Intersection Capacity Utilization	73.8%					
Analysis Period (min)	15					
c Critical Lane Group						

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1/17/2006

HCM Signalized Intersection Capacity Analysis 2010 Baseline Conditions - PM Peak Hour  
5: Mercer St & 1st Avenue 500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4↑	4↑					↑	↑		↑	↑	↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0					3.0	3.0		3.0	3.0	
Lane Util. Factor	0.95	1.00					1.00	0.93		1.00	0.95	
Flt Protected	1.00	1.00					1.00	0.95		1.00	1.00	
Satd. Flow (prot)	3525	3525					1736	3241		1736	3241	
Flt Permitted	1.00	1.00					0.95	1.00		0.95	1.00	
Satd. Flow (perm)	3525	3525					1736	3241		1736	3241	
Volume (vph)	95	1090	0	0	0	0	150	410	325	0	0	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	100	1147	0	0	0	0	158	432	342	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	21	0	0	0	0
Lane Group Flow (vph)	0	1247	0	0	0	0	158	753	0	0	0	0
Heavy Vehicles (%)	2%	2%	2%	0%	0%	0%	4%	4%	4%	0%	0%	0%
Turn Type	Perm	Perm					Perm	Perm				
Protected Phases	1							2				
Actuated Green, G (s)	36.0						36.0	36.0				
Effective Green, g (s)	37.0						37.0	37.0				
Actuated g/C Ratio	0.46						0.46	0.46				
Clearance Time (s)	4.0						4.0	4.0				
Lane Grp Cap (vph)	1830						803	1499				
v/s Ratio Prot								c0.23				
v/s Ratio Perm	0.35						0.09					
Uniform Delay, d1	0.77						0.20	0.50				
Progression Factor	1.00						1.00	1.00				
Incremental Delay, d2	3.5						0.5	1.2				
Delay (s)	21.4						13.3	16.3				
Level of Service	C						B	B				
Approach Delay (s)	21.4						0.0					0.0
Approach LOS	C						A					A
Intersection Summary												
HCM Average Control Delay		19.0							HCM Level of Service		B	
HCM Volume to Capacity ratio		0.63										
Actuated Cycle Length (s)		80.0							Sum of lost time (s)		6.0	
Intersection Capacity Utilization		61.3%							ICU Level of Service		B	
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis 2010 Baseline Conditions - PM Peak Hour  
6: Mercer St & 5th Ave 500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4↑	4↑					↑	↑		↑	↑	↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0					3.0	3.0		3.0	3.0	
Lane Util. Factor	0.86	1.00					0.91	0.91		0.91	0.91	
Flt Protected	1.00	1.00					1.00	0.95		1.00	1.00	
Satd. Flow (prot)	3525	3525					1736	3241		1736	3241	
Flt Permitted	1.00	1.00					0.95	1.00		0.95	1.00	
Satd. Flow (perm)	3525	3525					1736	3241		1736	3241	
Volume (vph)	60	1230	165	0	0	0	0	940	335	115	150	0
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	64	1309	176	0	0	0	0	1000	356	122	160	0
RTOR Reduction (vph)	0	0	60	0	0	0	0	0	173	0	0	0
Lane Group Flow (vph)	0	1373	116	0	0	0	0	1000	183	61	221	0
Conf. Peds. (#/hr)	30		35	35			30	95	25	25	95	
Heavy Vehicles (%)	1%	1%	1%	0%	0%	0%	1%	1%	1%	4%	4%	4%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	18	0
Parking (#/hr)	25	25										8
Turn Type	Perm	Perm	Perm					Perm	Perm	Perm	pm+pt	
Protected Phases	2							8		7	4	
Permitted Phases	2		2						8	4		
Actuated Green, G (s)	22.0	22.0	22.0					25.0	26.0	46.0	46.0	
Effective Green, g (s)	25.0	25.0	25.0					29.0	29.0	49.0	49.0	
Actuated g/C Ratio	0.31	0.31	0.31					0.36	0.36	0.61	0.61	
Clearance Time (s)	6.0	6.0	6.0					6.0	6.0	6.0	6.0	
Lane Grp Cap (vph)	1836	444						1156	484	405	1421	
v/s Ratio Prot								c0.31		0.03	c0.03	
v/s Ratio Perm	0.23	0.08						0.14	0.06	0.06		
Uniform Delay, d1	0.75	0.26						0.87	0.38	0.15	0.16	
Progression Factor	0.74	0.47						0.83	1.00	2.57	2.82	
Incremental Delay, d2	2.1	1.0						8.1	2.1	0.7	0.2	
Delay (s)	20.3	10.7						27.8	21.0	47.0	18.9	
Level of Service	C	B						C	C	D	B	
Approach Delay (s)	19.2						0.0					25.0
Approach LOS	B						A					C
Intersection Summary												
HCM Average Control Delay		22.6							HCM Level of Service		C	
HCM Volume to Capacity ratio		0.63										
Actuated Cycle Length (s)		80.0							Sum of lost time (s)		6.0	
Intersection Capacity Utilization		72.7%							ICU Level of Service		C	
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis 2010 Baseline Conditions - PM Peak Hour  
7: Mercer St & Dexter Avenue 500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBR	NBT	NBR	SBL	SBT	NEL	NER	NER2
Lane Configurations	4111	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	12	12	12	12	10	11	10	12	12	12	12
Lane Width	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Total Lost time (s)	0.86	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Lane Util. Factor	0.86	1.00	0.86	1.00	0.85	1.00	1.00	0.87	0.85	0.87	0.85
Flt	0.99	1.00	1.00	1.00	1.00	0.95	1.00	0.99	1.00	1.00	1.00
Flt Protected	5760	1479	3032	1405	1501	3217	1478	1381			
Satd. Flow (prot)	5760	1479	3032	1405	1501	3217	1478	1381			
Flt Permitted	0.99	1.00	1.00	1.00	1.00	0.95	1.00	0.99	1.00	1.00	1.00
Satd. Flow (perm)	5760	1479	3032	1405	1501	3217	1478	1381			
Volume (vph)	255	1510	50	100	460	155	285	440	25	315	10
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	287	1697	56	112	517	174	320	494	28	354	11
RTOR Reduction (vph)	0	0	0	58	0	13	0	0	0	2	0
Lane Group Flow (vph)	0	2040	0	54	517	161	320	494	210	181	0
Heavy Vehicles (%)	1%	1%	1%	0%	0%	0%	1%	1%	0%	0%	0%
Turn Type	Perm	1	custom	1	4	Perm pm-pt	3	7	2	2	2
Protected Phases	1	1	1	1	1	1	1	1	1	1	1
Permitted Phases	1	1	1	1	1	1	1	1	1	1	1
Actuated Green, G (s)	64.0	64.0	26.0	26.0	44.0	44.0	44.0	14.0	14.0	14.0	14.0
Effective Green, g (s)	67.0	67.0	29.0	29.0	47.0	47.0	47.0	17.0	17.0	17.0	17.0
Actuated g/C Ratio	0.48	0.48	0.21	0.21	0.34	0.34	0.34	0.12	0.12	0.12	0.12
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lane Grp Cap (vph)	2757	708	628	291	224	1080	179	168			
v/s Ratio Prot	0.04	0.17	0.11	0.11	0.11	0.11	0.11	0.13			
v/s Ratio Perm	0.35	0.74	0.08	0.82	0.55	1.43	0.46	1.17	1.08		
Uniform Delay, d1	29.5	19.7	53.1	49.7	39.9	36.5	61.5	61.5			
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Incremental Delay, d2	1.8	0.2	11.6	7.3	216.7	1.4	121.6	92.0			
Delay (s)	31.3	20.0	64.7	57.0	256.6	37.9	183.1	153.5			
Level of Service	C	B	E	E	F	D	F	F			
Approach Delay (s)	31.3	62.8				123.9	169.3				
Approach LOS	C	E				F	F				
Intersection Summary											
HCM Average Control Delay	68.3										
HCM Volume to Capacity ratio	1.04										
Actuated Cycle Length (s)	140.0								9.0		
Intersection Capacity Utilization	89.5%										
Analysis Period (min)	15										
c Critical Lane Group											

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HCM Signalized Intersection Capacity Analysis 2010 Baseline Conditions - PM Peak Hour  
8: Mercer St & 9th Ave 500 Fifth Avenue North

Movement	EBT	EBR	SBL	SBT	SBR	SER
Lane Configurations	1111	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	11	12	12	9	12	11
Lane Width	3.0	3.0	3.0	3.0	3.0	3.0
Total Lost time (s)	0.86	1.00	0.91	0.91	1.00	0.91
Lane Util. Factor	0.86	1.00	0.88	0.88	0.94	0.88
Flt	1.00	1.00	0.95	0.95	0.98	0.98
Flt Protected	5615	1288	2495			
Satd. Flow (prot)	5615	1288	2495			
Flt Permitted	1.00	0.95	0.98			
Satd. Flow (perm)	5615	1288	2495			
Volume (vph)	1965	35	705	285	80	0
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	2005	36	719	291	82	0
RTOR Reduction (vph)	2	0	6	6	0	0
Lane Group Flow (vph)	2039	0	354	726	0	0
Conf. Peds. (#/hr)	50					
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%
Bus Blockages (#/hr)	0	0	0	2	0	0
Turn Type	Perm	1	Perm	2!	2!	2!
Protected Phases	1	1	1	1	1	1
Permitted Phases	1	1	1	1	1	1
Actuated Green, G (s)	69.9	39.1	39.1	41.6	41.6	41.6
Effective Green, g (s)	72.4	41.6	41.6	44.1	44.1	44.1
Actuated g/C Ratio	0.60	0.35	0.35	0.35	0.35	0.35
Clearance Time (s)	5.5	5.5	5.5	5.5	5.5	5.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	3388	447	865			
v/s Ratio Prot	0.36					
v/s Ratio Perm	0.27	0.29				
Uniform Delay, d1	14.8	35.3	36.1			
Progression Factor	1.00	1.45	1.45			
Incremental Delay, d2	0.8	6.4	5.0			
Delay (s)	15.6	57.6	57.2			
Level of Service	B	E	E			
Approach Delay (s)	15.6		57.3			
Approach LOS	B	E	E			
Intersection Summary						
HCM Average Control Delay	30.2					
HCM Volume to Capacity ratio	0.69					
Actuated Cycle Length (s)	120.0					
Intersection Capacity Utilization	61.9%					
Analysis Period (min)	15					
c Critical Lane Group						

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HCM Signalized Intersection Capacity Analysis 2010 Baseline Conditions - PM Peak Hour  
9: Mercer St & Westlake Ave 500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4	1	1	4	1	1	4	1	1	4	1	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	12	12	12	12	12	11	12	12	12	12
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.86	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Flt Protected	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	5608	5608	5608	5608	5608	5608	5608	5608	5608	5608	5608	5608
Flt Permitted	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (perm)	5608	5608	5608	5608	5608	5608	5608	5608	5608	5608	5608	5608
Volume (vph)	180	2470	10	0	0	0	0	1070	605	230	95	0
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	182	2495	10	0	0	0	0	1081	611	232	96	0
RTOR Reduction (vph)	0	1	0	0	0	0	0	4	34	0	0	0
Lane Group Flow (vph)	0	2636	0	0	0	0	0	1146	508	232	96	0
Heavy Vehicles (%)	1%	1%	1%	0%	0%	0%	1%	1%	1%	0%	0%	0%
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	4	4	4	4	4	6	6	5	2	2
Permitted Phases	4	4	4	4	4	4	4	6	6	5	2	2
Actuated Green, G (s)	47.5	47.5	47.5	47.5	47.5	47.5	47.5	38.0	38.0	18.0	61.5	61.5
Effective Green, g (s)	50.0	50.0	50.0	50.0	50.0	50.0	50.0	40.5	40.5	20.5	64.0	64.0
Actuated g/C Ratio	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.34	0.34	0.17	0.53	0.53
Clearance Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	2337	2337	2337	2337	2337	2337	2337	996	442	277	912	912
v/s Ratio Prot	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.39	0.39	0.14	0.06	0.06
v/c Ratio	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	0.84	0.11	0.11
Uniform Delay, d1	35.0	35.0	35.0	35.0	35.0	35.0	35.0	39.8	39.8	48.1	13.8	13.8
Progression Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	1.00	1.00	1.27	0.76	0.76
Incremental Delay, d2	71.4	71.4	71.4	71.4	71.4	71.4	71.4	79.2	79.2	90.1	23.8	23.8
Delay (s)	101.3	101.3	101.3	101.3	101.3	101.3	101.3	118.9	118.9	129.7	85.1	107.7
Level of Service	F	F	F	F	F	F	F	F	F	F	B	B
Approach Delay (s)	101.3	101.3	101.3	101.3	101.3	101.3	101.3	122.3	122.3	122.3	63.3	63.3
Approach LOS	F	F	F	F	F	F	F	F	F	F	E	E
Intersection Summary												
HCM Average Control Delay												
HCM Volume to Capacity ratio												
Actuated Cycle Length (s)												
Intersection Capacity Utilization												
Analysis Period (min)												
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis 2010 Baseline Conditions - PM Peak Hour  
10: Mercer St & Fairview Ave 500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4	1	1	4	1	1	4	1	1	4	1	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	12	12	12	12	12	11	12	12	12	12
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Flt Protected	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	4512	4512	4512	4512	4512	4512	4512	4512	4512	4512	4512	4512
Flt Permitted	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (perm)	4512	4512	4512	4512	4512	4512	4512	4512	4512	4512	4512	4512
Volume (vph)	5	3275	330	70	425	1985	300	1310	10	65	65	65
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	5	3376	340	72	438	2046	309	1351	10	67	67	67
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	3381	406	0	438	1983	309	1360	0	67	67	67
Heavy Vehicles (%)	0%	0%	0%	0%	0%	1%	1%	0%	0%	0%	0%	0%
Turn Type	Split	Split	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	1	1	1	1	1	1	1	1	1	1	1	1
Permitted Phases	1	1	1	1	1	1	1	1	1	1	1	1
Actuated Green, G (s)	69.5	69.5	69.5	12.5	87.5	17.5	35.5	17.5	35.5	17.5	35.5	35.5
Effective Green, g (s)	72.0	72.0	72.0	15.0	90.0	24.0	42.0	24.0	42.0	24.0	42.0	42.0
Actuated g/C Ratio	0.60	0.60	0.60	0.12	0.75	0.20	0.35	0.20	0.35	0.20	0.35	0.35
Clearance Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	2707	872	872	380	1900	319	895	323	895	323	895	895
v/s Ratio Prot	0.75	0.28	0.28	0.14	0.78	0.19	0.53	0.04	0.53	0.04	0.53	0.53
v/c Ratio	1.25	0.47	0.47	1.12	1.04	0.97	1.52	0.21	1.52	0.21	1.52	1.52
Uniform Delay, d1	24.0	13.3	13.3	52.5	15.0	47.6	39.0	40.1	39.0	40.1	39.0	39.0
Progression Factor	0.45	0.42	0.42	1.00	1.00	1.00	1.00	0.69	1.00	0.69	1.00	1.00
Incremental Delay, d2	113.2	0.6	0.6	83.4	33.1	41.4	239.7	0.3	239.7	0.3	239.7	239.7
Delay (s)	124.0	6.2	6.2	135.9	48.1	89.1	278.7	28.1	278.7	28.1	278.7	278.7
Level of Service	F	A	A	F	D	F	F	C	F	C	F	C
Approach Delay (s)	111.2	6.2	6.2	135.9	48.1	89.1	278.7	28.1	278.7	28.1	278.7	278.7
Approach LOS	F	A	A	F	D	F	F	C	F	C	F	C
Intersection Summary												
HCM Average Control Delay												
HCM Volume to Capacity ratio												
Actuated Cycle Length (s)												
Intersection Capacity Utilization												
Analysis Period (min)												
c Critical Lane Group												



HCM Signalized Intersection Capacity Analysis 2010 Baseline Conditions - PM Peak Hour  
11: Republican St & 5th Ave 500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	12	12	12	12	12	12	12	12	12	12	12	12
Lane Width	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Total Lost time (s)	0.95	0.95	1.00	0.91	1.00	0.91	1.00	0.95	1.00	0.95	1.00	0.95
Lane Util. Factor	1.00	0.98	1.00	1.00	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99
Flpb, ped/bikes	0.98	1.00	0.86	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt	1.00	0.85	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.97	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1659	1448	1470	4912	1671	3314						
Flt Permitted	0.97	1.00	0.54	1.00	0.16	1.00						
Satd. Flow (perm)	1659	1448	835	4912	280	3314						
Volume (vph)	0	0	0	10	5	20	20	1265	5	10	315	10
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	0	0	0	11	5	22	22	1360	5	11	339	11
RTOR Reduction (vph)	0	0	0	0	0	16	0	0	0	0	2	0
Lane Group Flow (vph)	0	0	0	0	16	6	22	1365	0	11	348	0
Conf. Peds. (#/hr)	10	20	20	10	75	20	20	20	20	20	75	20
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	2%	2%	2%	4%	4%
Parking (#/hr)	8											
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	6	6	6	8	8	8	8	8	8	8	8	8
Permitted Phases	6	6	6	8	8	8	8	8	8	8	8	8
Actuated Green, G (s)	20.0	20.0	49.0	49.0	49.0	49.0	49.0	49.0	49.0	49.0	49.0	49.0
Effective Green, g (s)	22.0	22.0	52.0	52.0	52.0	52.0	52.0	52.0	52.0	52.0	52.0	52.0
Actuated g/C Ratio	0.28	0.28	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65
Clearance Time (s)	5.0	5.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	456	398	543	3193	182	2154						
v/s Ratio Prot	0.01	0.00	0.03	0.04	0.06	0.10						
v/s Ratio Perm	0.04	0.02	0.04	0.43	0.06	0.16						
Uniform Delay, d1	21.2	21.1	5.0	6.8	5.1	5.5						
Progression Factor	1.00	1.00	0.52	0.32	0.86	0.91						
Incremental Delay, d2	0.0	0.0	0.1	0.3	0.6	0.2						
Delay (s)	21.3	21.1	2.7	2.5	5.0	5.2						
Level of Service	C	C	C	A	A	A						
Approach Delay (s)	0.0	21.2	21.2	2.5	5.0	5.2						
Approach LOS	A	C	C	A	A	A						
Intersection Summary												
HCM Average Control Delay	3.4											
HCM Volume to Capacity ratio	0.31											
Actuated Cycle Length (s)	80.0											
Intersection Capacity Utilization	41.8%											
Analysis Period (min)	15											
c Critical Lane Group												

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HCM Signalized Intersection Capacity Analysis 2010 Baseline Conditions - PM Peak Hour  
12: Harrison St & 5th Ave 500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	12	12	12	12	12	12	12	12	12	12	12	12
Lane Width	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Total Lost time (s)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Util. Factor	1.00	0.90	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	0.94	1.00	0.90	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt	1.00	0.85	1.00	1.00	0.85	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.95	1.00	0.97	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1517	1226	1669	2748	1513	3333						
Flt Permitted	0.73	1.00	0.87	1.00	0.53	1.00						
Satd. Flow (perm)	1169	1226	1496	2748	851	3333						
Volume (vph)	15	0	25	25	10	715	25	560	15	5	300	10
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	16	0	27	27	11	786	27	615	16	5	330	11
RTOR Reduction (vph)	0	18	0	0	0	0	0	0	0	0	2	0
Lane Group Flow (vph)	16	9	0	0	38	786	27	629	0	0	344	0
Conf. Peds. (#/hr)	100	100	100	100	185	185	115	115	185	115	185	185
Heavy Vehicles (%)	19%	19%	19%	0%	0%	0%	4%	4%	4%	4%	4%	4%
Parking (#/hr)	8											
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	2	2	6	6	6	6	8	8	8	8	8	8
Permitted Phases	2	2	6	6	6	6	8	8	8	8	8	8
Actuated Green, G (s)	26.9	26.9	26.9	26.9	26.9	26.9	43.1	43.1	43.1	43.1	43.1	43.1
Effective Green, g (s)	27.9	27.9	27.9	27.9	27.9	27.9	46.1	46.1	46.1	46.1	46.1	46.1
Actuated g/C Ratio	0.35	0.35	0.35	0.35	0.35	0.35	0.58	0.58	0.58	0.58	0.58	0.58
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	408	428	522	958	490	1921						
v/s Ratio Prot	0.01	0.01	0.03	0.03	0.03	0.03	0.19	0.19	0.19	0.19	0.19	0.19
v/s Ratio Perm	0.04	0.02	0.07	0.82	0.06	0.33	0.19	0.19	0.19	0.19	0.19	0.19
Uniform Delay, d1	17.2	17.1	17.4	23.8	7.4	8.9	8.1	8.1	8.1	8.1	8.1	8.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.58	1.58	1.58	1.58	1.58	1.58
Incremental Delay, d2	0.0	0.0	0.1	5.7	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Delay (s)	17.2	17.1	17.5	29.5	12.1	14.2	10.9	10.9	10.9	10.9	10.9	10.9
Level of Service	B	B	B	C	B	B	B	B	B	B	B	B
Approach Delay (s)	17.2	17.2	28.9	14.1	14.1	14.1	10.9	10.9	10.9	10.9	10.9	10.9
Approach LOS	B	B	C	B	B	B	B	B	B	B	B	B
Intersection Summary												
HCM Average Control Delay	20.1											
HCM Volume to Capacity ratio	0.51											
Actuated Cycle Length (s)	80.0											
Intersection Capacity Utilization	64.3%											
Analysis Period (min)	15											
c Critical Lane Group												

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The Transpo Group  
Synchro 6 Report  
1/17/2006

# HCM Unsignalized Intersection Capacity Analysis 2010 Baseline Conditions - PM Peak Hour 13: Harrison St & Broad St 500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Sign Control	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Grade	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Volume (veh/h)	0	0	5	0	0	60	0	895	15	0	1005	700
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	0	0	5	0	0	62	0	716	15	0	1036	722
Pedestrians	20											
Lane Width (ft)	11.0											
Walking Speed (ft/s)	4.0											
Percent Blockage	2											
Right turn flare (veh)												
Median type	None											
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1837	2149	899	1242	2502	366	1778					732
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1837	2149	899	1242	2502	366	1778					732
IC, single (s)	7.5	6.5	6.9	7.6	6.6	7.0	4.1					4.1
IC, 2 stage (s)												
IF (s)	3.5	4.0	3.3	3.6	4.0	3.4	2.2					2.2
p0 queue free %	100	100	98	100	100	90	100					100
cM capacity (veh/h)	42	48	282	124	27	622	345					875
Direction, Lane #	EB1	WB1	NE1	NE2	SW1	SW2						
Volume Total	5	62	478	254	691	1067						
Volume Left	0	0	0	0	0	0						
Volume Right	5	62	478	254	691	1067						
cSH	282	622	1700	1700	1700	1700						
Volume to Capacity	0.02	0.10	0.28	0.15	0.41	0.83						
Queue Length 95th (ft)	1	8	0	0	0	0						
Control Delay (s)	18.0	11.4	0.0	0.0	0.0	0.0						
Lane LOS	C	B										
Approach Delay (s)	18.0	11.4	0.0									
Approach LOS	C	B										
Intersection Summary												
Average Delay			0.3									
Intersection Capacity/Utilization			61.0%									
Analysis Period (min)			15									

# HCM Signalized Intersection Capacity Analysis 2010 Baseline Conditions - PM Peak Hour 14: 5th Ave & Broad St 500 Fifth Avenue North

Movement	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations	1P	1P	1P	1P	1P	1P	1P	1P	1P	1P	1P	1P
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	12	11	11	11	11	11	12	11	11	12
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Frpb, ped/bikes	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	3217	3217	3217	3217	3217	3217	3217	3217	3217	3217	3217	3217
Flt Permitted	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (perm)	3060	3060	3060	3060	3060	3060	3060	3060	3060	3060	3060	3060
Volume (vph)	5	400	50	0	280	60	175	560	0	125	660	20
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	5	430	54	0	301	65	188	602	0	134	710	22
RTOR Reduction (vph)	0	12	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	477	0	0	301	65	188	602	0	134	729	0
Conf. Peds. (#/hr)	115	85	85	115	130	130	45	45	130	45	45	130
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	3%	3%	3%	6%	6%	6%
Bus Blockages (#/hr)	0	20	0	0	18	0	0	0	0	0	0	0
Turn Type												
Protected Phases	8											
Permitted Phases												
Actuated Green, G (s)	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0
Effective Green, g (s)	27.0	27.0	27.0	27.0	27.0	27.0	27.0	27.0	27.0	27.0	27.0	27.0
Actuated g/C Ratio	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34
Clearance Time (s)	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0
Lane Grp Cap (vph)	1033	1124	445	360	1143	350	1099					
v/s Ratio Prot		0.09			0.11	0.18						
v/s Ratio Perm		0.16			0.05							
v/c Ratio		3.00dr			0.27	0.15	0.52	0.53		0.38	0.66	
Uniform Delay, d1		20.8			19.3	18.5	27.9	21.4		27.0	22.6	
Progression Factor		0.94			0.55	0.44	1.23	0.83		1.00	1.00	
Incremental Delay, d2		1.5			0.6	0.7	4.9	1.6		3.2	3.2	
Delay (s)		21.1			11.2	8.8	39.2	19.3		30.2	25.8	
Level of Service		C			B	A	D	B		C	C	
Approach Delay (s)		21.1			10.8		24.0					
Approach LOS		C			B		C					
Intersection Summary												
HCM Average Control Delay			22.4									
HCM Volume to Capacity ratio			0.55									
Actuated Cycle Length (s)			80.0									
Intersection Capacity Utilization			62.4%									
Analysis Period (min)			15									
dr Delactio Right Lane. Recode with 1 though lane as a right lane.												
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis 2010 Baseline Conditions - PM Peak Hour  
15: Denny Way & 1st Avenue

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SBL	SBR	NWL	NWR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Total Lost time (s)	0.95	0.97	0.97	0.97	0.97	0.97	0.95	0.95	0.95	0.95
Lane Util. Factor	0.95	0.97	0.97	0.97	0.97	0.97	0.95	0.95	0.95	0.95
Fit Protected	3354	4870	4870	4870	4870	4870	1719	1461	1719	1461
Satd. Flow (prot)	0.95	1.00	1.00	1.00	1.00	1.00	0.95	1.00	0.95	1.00
Fit Permitted	3179	4870	4870	4870	4870	4870	1719	1461	1719	1461
Satd. Flow (perm)	5.1205	350.0	1320.0	370.0	0.0	0.0	360.0	15.0	360.0	15.0
Volume (vph)	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Peak-hour factor, PHF	5.1282	372.0	1404.0	394.0	0.0	0.0	383.0	16.0	383.0	16.0
Adj. Flow (vph)	0.27	0.0	0.51	0.0	0.0	0.0	0.0	0.0	0.0	0.0
RTOR Reduction (vph)	0.1632	0.0	1747.0	0.0	0.0	0.0	363.0	16.0	363.0	16.0
Lane Group Flow (vph)	4%	4%	3%	3%	0%	0%	5%	5%	0%	0%
Heavy Vehicles (%)	1	1	1	1	1	1	1	1	1	1
Turn Type	Protected Phases	Permitted Phases	Protected Phases	Permitted Phases	Protected Phases	Permitted Phases	Protected Phases	Permitted Phases	Protected Phases	Permitted Phases
Actuated Green, G (s)	57.0	57.0	57.0	57.0	57.0	57.0	33.0	33.0	33.0	33.0
Effective Green, g (s)	59.0	59.0	59.0	59.0	59.0	59.0	35.0	35.0	35.0	35.0
Actuated g/C Ratio	0.59	0.59	0.59	0.59	0.59	0.59	0.35	0.35	0.35	0.35
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lane Grp Cap (vph)	1876	2873	602	511	602	511	602	511	602	511
v/s Ratio Prot	0.36	0.36	0.36	0.36	0.36	0.36	0.22	0.22	0.22	0.22
v/s Ratio Perm	0.51	0.51	0.51	0.51	0.51	0.51	0.01	0.01	0.01	0.01
v/c Ratio	5.72d	17.3	13.1	13.1	13.1	13.1	0.64	0.64	0.64	0.64
Uniform Delay, d1	1.00	1.00	1.00	1.00	1.00	1.00	27.2	21.4	27.2	21.4
Progression Factor	5.8	5.8	5.8	5.8	5.8	5.8	1.00	1.00	1.00	1.00
Incremental Delay, d2	23.1	23.1	23.1	23.1	23.1	23.1	5.1	0.1	5.1	0.1
Delay (s)	23.1	23.1	23.1	23.1	23.1	23.1	32.2	21.5	32.2	21.5
Level of Service	C	C	C	C	C	C	C	C	C	C
Approach Delay (s)	23.1	23.1	23.1	23.1	23.1	23.1	31.8	21.5	31.8	21.5
Approach LOS	C	C	C	C	C	C	A	A	A	A
Intersection Summary	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9
HCM Average Control Delay	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78
HCM Volume to Capacity ratio	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Actuated Cycle Length (s)	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%
Intersection Capacity Utilization	15	15	15	15	15	15	15	15	15	15
Analysis Period (min)	15	15	15	15	15	15	15	15	15	15
dr Defacto Right Lane. Recode with 1 though lane as a right lane.										
c Critical Lane Group										

HCM Signalized Intersection Capacity Analysis 2010 Baseline Conditions - PM Peak Hour  
16: Denny Way & Broad St

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NFR	SWL	SWT	SWR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	12	11	12	11	12	11	12	10	12	12	10	9
Lane Width	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Total Lost time (s)	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frbi. ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb. ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fit Protected	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	3365	3291	3291	3291	3291	3291	3291	3291	3291	3291	3291	3291
Fit Permitted	3057	3057	3057	3057	3057	3057	3057	3057	3057	3057	3057	3057
Satd. Flow (perm)	15.780	0.0	1410.0	10.0	0.0	510.0	60.0	5.0	480.0	290.0	2.0	2.0
Volume (vph)	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Peak-hour factor, PHF	16	830	0	1500	11	0	543	64	5	511	309	0.94
Adj. Flow (vph)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
RTOR Reduction (vph)	0.846	0.0	1511.0	0.0	0.0	598.0	0.0	0.0	516	287	18	18
Lane Group Flow (vph)	22	12	12	12	12	12	12	12	12	12	12	12
Conf. Peds. (#/hr)	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Heavy Vehicles (%)	0	3	0	0	23	0	0	0	0	0	0	0
Bus Blockages (#/hr)	1	1	1	1	1	1	1	1	1	1	1	1
Turn Type	Protected Phases	Permitted Phases	Protected Phases	Permitted Phases	Protected Phases	Permitted Phases	Protected Phases	Permitted Phases	Protected Phases	Permitted Phases	Protected Phases	Permitted Phases
Actuated Green, G (s)	58.0	58.0	58.0	58.0	58.0	58.0	32.0	32.0	32.0	32.0	32.0	32.0
Effective Green, g (s)	60.0	60.0	60.0	60.0	60.0	60.0	34.0	34.0	34.0	34.0	34.0	34.0
Actuated g/C Ratio	0.60	0.60	0.60	0.60	0.60	0.60	0.34	0.34	0.34	0.34	0.34	0.34
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lane Grp Cap (vph)	1834	1975	1975	1975	1975	1975	1107	1077	1077	1077	1077	1077
v/s Ratio Prot	0.28	0.28	0.28	0.28	0.28	0.28	0.18	0.18	0.18	0.18	0.18	0.18
v/s Ratio Perm	0.46	0.46	0.46	0.46	0.46	0.46	0.54	0.54	0.54	0.54	0.54	0.54
v/c Ratio	11.1	11.1	11.1	11.1	11.1	11.1	26.7	26.7	26.7	26.7	26.7	26.7
Uniform Delay, d1	1.95	1.95	1.95	1.95	1.95	1.95	1.00	1.00	1.00	1.00	1.00	1.00
Progression Factor	0.1	0.1	0.1	0.1	0.1	0.1	1.9	1.9	1.9	1.9	1.9	1.9
Incremental Delay, d2	21.7	21.7	21.7	21.7	21.7	21.7	28.6	28.6	28.6	28.6	28.6	28.6
Delay (s)	21.7	21.7	21.7	21.7	21.7	21.7	28.6	28.6	28.6	28.6	28.6	28.6
Level of Service	C	C	C	C	C	C	C	C	C	C	C	C
Approach Delay (s)	21.7	21.7	21.7	21.7	21.7	21.7	28.6	28.6	28.6	28.6	28.6	28.6
Approach LOS	C	C	C	C	C	C	C	C	C	C	C	C
Intersection Summary	20.6	20.6	20.6	20.6	20.6	20.6	20.6	20.6	20.6	20.6	20.6	20.6
HCM Average Control Delay	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71
HCM Volume to Capacity ratio	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Actuated Cycle Length (s)	65.7%	65.7%	65.7%	65.7%	65.7%	65.7%	65.7%	65.7%	65.7%	65.7%	65.7%	65.7%
Intersection Capacity Utilization	15	15	15	15	15	15	15	15	15	15	15	15
Analysis Period (min)	15	15	15	15	15	15	15	15	15	15	15	15
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis 2010 Baseline Conditions - PM Peak Hour  
17: Denny Way & 5th Ave 500 Fifth Avenue North

Movement	EBT	EBR	EBR2	WBT	WBR	NBL	NBT	NBR	NBR2	SBL2	SBL	SBL1
Lane Configurations	↑↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	10	12	12	10	12	12	11	12	13
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Frpb, ped/bikes	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fit	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Fit Protected	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	3272	3272	3272	3272	3272	3272	3272	3272	3272	3272	3272	3272
Fit Permitted	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (perm)	3272	3272	3272	3272	3272	3272	3272	3272	3272	3272	3272	3272
Volume (vph)	745	175	15	795	140	5	150	35	10	110	180	110
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	793	186	16	846	149	5	160	37	11	117	191	117
RTOR Reduction (vph)	1	0	0	13	0	0	4	0	0	0	0	4
Lane Group Flow (vph)	994	0	0	982	0	0	209	0	0	0	308	124
Confl. Peds. (#/hr)	2%	2%	2%	1%	1%	6%	6%	6%	6%	3%	3%	3%
Heavy Vehicles (%)	2%	2%	2%	1%	1%	6%	6%	6%	6%	3%	3%	3%
Bus Blockages (#/hr)	3	0	0	4	0	0	18	0	0	0	0	0
Turn Type	1	1	1	1	1	3	3	3	3	2	2	2
Protected Phases	1	1	1	1	1	3	3	3	3	2	2	2
Permitted Phases	1	1	1	1	1	3	3	3	3	2	2	2
Actuated Green, G (s)	51.4	51.4	51.4	51.4	51.4	12.0	12.0	12.0	12.0	21.6	21.6	21.6
Effective Green, g (s)	53.4	53.4	53.4	53.4	53.4	14.0	14.0	14.0	14.0	23.6	23.6	23.6
Actuated g/C Ratio	0.53	0.53	0.53	0.53	0.53	0.14	0.14	0.14	0.14	0.24	0.24	0.24
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1747	1716	1716	1716	1716	414	414	414	414	413	443	443
v/s Ratio Prot	0.30	0.30	0.30	0.30	0.30	c0.07	c0.07	c0.07	c0.07	c0.18	0.07	0.07
v/s Ratio Perm	0.57	0.57	0.57	0.57	0.57	0.50	0.50	0.50	0.50	0.75	0.28	0.28
Uniform Delay, d1	15.6	15.6	15.6	15.6	15.6	39.8	39.8	39.8	39.8	35.4	31.3	31.3
Progression Factor	0.21	0.21	0.21	0.21	0.21	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	7.2	0.3	0.3
Delay (s)	4.3	4.3	4.3	4.3	4.3	40.8	40.8	40.8	40.8	42.6	31.6	31.6
Level of Service	A	A	A	A	A	D	D	D	D	D	C	C
Approach Delay (s)	4.3	4.3	4.3	4.3	4.3	40.8	40.8	40.8	40.8	39.4	39.4	39.4
Approach LOS	A	A	A	A	A	D	D	D	D	D	D	D
Intersection Summary												
HCM Average Control Delay	16.3											
HCM Volume to Capacity ratio	0.61											
Actuated Cycle Length (s)	100.0											
Intersection Capacity Utilization	58.7%											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis 2010 Baseline Conditions - PM Peak Hour  
17: Denny Way & 5th Ave 500 Fifth Avenue North

Movement	SBR
Lane Configurations	↑
Ideal Flow (vphpl)	1900
Lane Width	12
Total Lost time (s)	
Lane Util. Factor	
Frpb, ped/bikes	
Flpb, ped/bikes	
Fit	
Fit Protected	
Satd. Flow (prot)	
Fit Permitted	
Satd. Flow (perm)	
Volume (vph)	10
Peak-hour factor, PHF	0.94
Adj. Flow (vph)	11
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Confl. Peds. (#/hr)	17
Heavy Vehicles (%)	3%
Bus Blockages (#/hr)	0
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	
Intersection Summary	



HCM Signalized Intersection Capacity Analysis 2010 Baseline Conditions - PM Peak Hour  
18: Denny Way & Aurora Ave 500 Fifth Avenue North

Movement	EBT	EBR	EBR2	WBT	WBR	NBT	NBR	NBR2	SBL2	SBL	SBT	SBR
Lane Configurations	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	11	12	11	12	12	12	12	12	12	12
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Fit	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Fit Protected	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	3083	3015	3015	3155	3155	3155	3155	3155	3155	3155	3155	3155
Fit Permitted	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (perm)	3083	3015	3015	3155	3155	3155	3155	3155	3155	3155	3155	3155
Volume (vph)	975	55	55	1115	285	1020	145	5	220	70	0	450
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	995	56	56	1138	291	1041	148	5	224	71	0	459
RTOR Reduction (vph)	0	0	0	22	0	0	0	0	0	0	0	3
Lane Group Flow (vph)	1056	0	0	1407	0	1194	0	0	0	235	239	237
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	4	0
Turn Type	2	2	2	4	4	4	4	4	4	4	4	4
Protected Phases	2	2	2	4	4	4	4	4	4	4	4	4
Permitted Phases	26.0	26.0	26.0	32.4	32.4	32.4	32.4	32.4	32.4	32.4	32.4	32.4
Effective Green, G (s)	32.0	32.0	32.0	34.4	34.4	34.4	34.4	34.4	34.4	34.4	34.4	34.4
Actuated g/C Ratio	0.32	0.32	0.32	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34
Clearance Time (s)	9.0	9.0	9.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	987	965	965	1085	1085	1085	1085	1085	1085	1085	1085	1085
v/s Ratio Prot	0.34	c0.47	c0.47	c0.38	c0.38	c0.38	c0.38	c0.38	c0.38	c0.38	c0.38	c0.38
v/s Ratio Perm	1.07	1.46	1.46	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10
Uniform Delay, d1	34.0	34.0	34.0	32.8	32.8	32.8	32.8	32.8	32.8	32.8	32.8	32.8
Progression Factor	0.99	0.53	0.53	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	47.9	210.1	210.1	59.1	59.1	59.1	59.1	59.1	59.1	59.1	59.1	59.1
Delay (s)	81.6	228.1	228.1	91.9	91.9	91.9	91.9	91.9	91.9	91.9	91.9	91.9
Level of Service	F	F	F	F	F	F	F	F	F	F	F	F
Approach Delay (s)	81.6	228.1	228.1	91.9	91.9	91.9	91.9	91.9	91.9	91.9	91.9	91.9
Approach LOS	F	F	F	F	F	F	F	F	F	F	F	F
Intersection Summary												
HCM Average Control Delay	121.0											
HCM Volume to Capacity ratio	1.13											
Actuated Cycle Length (s)	100.0											
Intersection Capacity Utilization	108.8%											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis 2010 Baseline Conditions - PM Peak Hour  
18: Denny Way & Aurora Ave 500 Fifth Avenue North

Movement	SBR2
Lane Configurations	↑↑
Ideal Flow (vphpl)	1900
Lane Width	12
Total Lost time (s)	3.0
Lane Util. Factor	0.95
Fit	0.99
Fit Protected	1.00
Satd. Flow (prot)	3083
Fit Permitted	1.00
Satd. Flow (perm)	3083
Volume (vph)	20
Peak-hour factor, PHF	0.98
Adj. Flow (vph)	20
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Heavy Vehicles (%)	2%
Bus Blockages (#/hr)	0
Turn Type	
Protected Phases	
Permitted Phases	
Effective Green, G (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	
Intersection Summary	

HCM Signalized Intersection Capacity Analysis 2010 Baseline Conditions - PM Peak Hour  
19: Denny Way & Dexter Avenue 500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4P	4P	4P	4P	4P	4P	4P	4P	4P	4P	4P	4P
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Fr	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.95
Fr Protected	0.99	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	0.96
Satd. Flow (prot)	3195	3210	1464	2887	1593	3185	1425	1593	3185	1425	1593	3185
Fr Permitted	0.56	1.00	0.47	1.00	0.53	1.00	1.00	0.53	1.00	1.00	0.53	1.00
Satd. Flow (perm)	1808	3210	724	2887	891	3185	1425	891	3185	1425	891	3185
Volume (vph)	140	1105	10	0	1130	100	10	195	20	105	260	220
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	149	1176	11	0	1202	106	11	207	21	112	277	234
RTOR Reduction (vph)	0	0	0	0	4	0	0	10	0	0	0	185
Lane Group Flow (vph)	0	1336	0	0	1304	0	11	218	0	112	277	49
Heavy Vehicles (%)	1%	1%	1%	0%	0%	0%	11%	11%	11%	2%	2%	2%
Turn Type	pm+pt	pm+pt	pm+pt	pm+pt	pm+pt	pm+pt	pm+pt	pm+pt	pm+pt	pm+pt	pm+pt	pm+pt
Protected Phases	2	5	1	1	1	1	1	1	1	1	1	1
Permitted Phases	5	5	3	3	3	3	3	3	3	3	3	3
Actuated Green, G (s)	70.2	52.2	17.8	17.8	52.2	17.8	17.8	52.2	17.8	17.8	52.2	17.8
Effective Green, g (s)	73.2	55.2	20.8	20.8	55.2	20.8	20.8	55.2	20.8	20.8	55.2	20.8
Actuated g/C Ratio	0.73	0.55	0.21	0.21	0.55	0.21	0.21	0.55	0.21	0.21	0.55	0.21
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1532	1772	151	600	1772	151	600	1772	151	600	1772	151
v/s Ratio Prot	c0.13	0.41	0.02	0.02	0.41	0.02	0.02	0.41	0.02	0.02	0.41	0.02
v/s Ratio Perm	c0.51	0.87	0.07	0.36	0.87	0.07	0.36	0.87	0.07	0.36	0.87	0.07
v/c Ratio	0.99	0.74	0.07	0.36	0.74	0.07	0.36	0.74	0.07	0.36	0.74	0.07
Uniform Delay, d1	9.9	16.9	31.8	33.9	16.9	31.8	33.9	16.9	31.8	33.9	16.9	31.8
Progression Factor	0.79	0.57	1.00	1.00	0.57	1.00	1.00	0.57	1.00	1.00	0.57	1.00
Incremental Delay, d2	0.6	2.5	0.2	0.4	2.5	0.2	0.4	2.5	0.2	0.4	2.5	0.2
Delay (s)	8.4	12.2	32.1	34.3	12.2	32.1	34.3	12.2	32.1	34.3	12.2	32.1
Level of Service	A	B	C	C	B	C	C	B	C	C	B	C
Approach Delay (s)	8.4	12.2	34.2	34.2	8.4	12.2	34.2	8.4	12.2	34.2	8.4	12.2
Approach LOS	A	B	C	C	A	B	C	A	B	C	A	B
Intersection Summary												
HCM Average Control Delay	16.3											
HCM Volume to Capacity ratio	0.80											
Actuated Cycle Length (s)	100.0											
Intersection Capacity Utilization	103.5%											
Analysis Period (min)	15											
c Critical Lane Group												

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HCM Signalized Intersection Capacity Analysis 2010 Baseline Conditions - PM Peak Hour  
20: Denny Way & Westlake Ave 500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4P	4P	4P	4P	4P	4P	4P	4P	4P	4P	4P	4P
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Fr	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.95
Fr Protected	0.99	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	0.96
Satd. Flow (prot)	3089	3099	1464	2887	1593	3185	1425	1593	3185	1425	1593	3185
Fr Permitted	0.56	1.00	0.47	1.00	0.53	1.00	1.00	0.53	1.00	1.00	0.53	1.00
Satd. Flow (perm)	1808	3210	724	2887	891	3185	1425	891	3185	1425	891	3185
Volume (vph)	140	1105	10	0	1130	100	10	195	20	105	260	220
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	149	1176	11	0	1202	106	11	207	21	112	277	234
RTOR Reduction (vph)	0	0	0	0	4	0	0	10	0	0	0	185
Lane Group Flow (vph)	0	1336	0	0	1304	0	11	218	0	112	277	49
Heavy Vehicles (%)	1%	1%	1%	0%	0%	0%	11%	11%	11%	2%	2%	2%
Turn Type	pm+pt	pm+pt	pm+pt	pm+pt	pm+pt	pm+pt	pm+pt	pm+pt	pm+pt	pm+pt	pm+pt	pm+pt
Protected Phases	2	5	1	1	1	1	1	1	1	1	1	1
Permitted Phases	5	5	3	3	3	3	3	3	3	3	3	3
Actuated Green, G (s)	70.2	52.2	17.8	17.8	52.2	17.8	17.8	52.2	17.8	17.8	52.2	17.8
Effective Green, g (s)	73.2	55.2	20.8	20.8	55.2	20.8	20.8	55.2	20.8	20.8	55.2	20.8
Actuated g/C Ratio	0.73	0.55	0.21	0.21	0.55	0.21	0.21	0.55	0.21	0.21	0.55	0.21
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1532	1772	151	600	1772	151	600	1772	151	600	1772	151
v/s Ratio Prot	c0.13	0.41	0.02	0.02	0.41	0.02	0.02	0.41	0.02	0.02	0.41	0.02
v/s Ratio Perm	c0.51	0.87	0.07	0.36	0.87	0.07	0.36	0.87	0.07	0.36	0.87	0.07
v/c Ratio	0.99	0.74	0.07	0.36	0.74	0.07	0.36	0.74	0.07	0.36	0.74	0.07
Uniform Delay, d1	9.9	16.9	31.8	33.9	16.9	31.8	33.9	16.9	31.8	33.9	16.9	31.8
Progression Factor	0.79	0.57	1.00	1.00	0.57	1.00	1.00	0.57	1.00	1.00	0.57	1.00
Incremental Delay, d2	0.6	2.5	0.2	0.4	2.5	0.2	0.4	2.5	0.2	0.4	2.5	0.2
Delay (s)	8.4	12.2	32.1	34.3	12.2	32.1	34.3	12.2	32.1	34.3	12.2	32.1
Level of Service	A	B	C	C	B	C	C	B	C	C	B	C
Approach Delay (s)	8.4	12.2	34.2	34.2	8.4	12.2	34.2	8.4	12.2	34.2	8.4	12.2
Approach LOS	A	B	C	C	A	B	C	A	B	C	A	B
Intersection Summary												
HCM Average Control Delay	16.3											
HCM Volume to Capacity ratio	0.80											
Actuated Cycle Length (s)	100.0											
Intersection Capacity Utilization	103.5%											
Analysis Period (min)	15											
c Critical Lane Group												

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HCM Signalized Intersection Capacity Analysis 2010 Baseline Conditions - PM Peak Hour  
 21: Denny Way & Fairview Ave 500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1	1	1	1	1	1	1	1	1	1	1	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	12	11	11	12	9	10	12	10	10	12
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	0.97	0.95	1.00	0.95	1.00	0.95
Fit Protected	1.00	1.00	1.00	0.98	1.00	0.96	1.00	0.96	1.00	0.95	1.00	0.95
Fit Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1555	3107	1555	3054	1555	2808	2872	1501	2855	1501	2855	1501
Fit Permitted	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	1555	3107	1555	3054	1555	2808	2872	1501	2855	1501	2855	1501
Volume (vph)	200	990	5	45	735	100	420	490	200	225	300	145
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	208	1031	5	47	766	104	438	510	208	234	312	151
RTOR Reduction (vph)	0	0	0	0	11	0	0	48	0	0	62	0
Lane Group Flow (vph)	208	1036	0	47	860	0	438	670	0	234	401	0
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	1	6	5	2	3	8	7	4				
Permitted Phases												
Actuated Green, G (s)	15.4	38.0	5.4	28.0	18.0	27.6	9.0	18.6				
Effective Green, g (s)	17.4	40.0	7.4	30.0	20.0	29.6	11.0	20.6				
Actuated g/C Ratio	0.17	0.40	0.07	0.30	0.20	0.30	0.11	0.21				
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0				
Lane Grp Cap (vph)	271	1243	115	916	562	850	165	588				
v/s Ratio Prot	c0.13	0.33	0.03	c0.28	c0.16	c0.23	c0.16	0.14				
v/s Ratio Perm												
v/c Ratio	0.77	0.83	0.41	0.94	0.78	0.79	1.42	0.68				
Uniform Delay, d1	39.4	27.0	44.2	34.1	37.9	32.3	44.5	36.7				
Progression Factor	1.00	1.00	0.99	1.25	1.00	1.00	1.09	0.82				
Incremental Delay, d2	12.2	6.7	1.9	15.3	6.8	4.9	218.2	3.1				
Delay (s)	51.6	33.7	41.4	57.9	44.7	37.2	268.8	33.1				
Level of Service	D	C	D	E	D	D	F	C				
Approach Delay (s)	36.7			57.1		40.0		111.5				
Approach LOS	D			E		D		F				
Intersection Summary												
HCM Average Control Delay	55.3											
HCM Volume to Capacity ratio	0.90											
Actuated Cycle Length (s)	100.0											
Intersection Capacity Utilization	87.8%											
Analysis Period (min)	15											
c. Critical Lane Group												

HCM Signalized Intersection Capacity Analysis 2010 Baseline Conditions - PM Peak Hour  
 22: Denny Way & Stewart St 500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1	1	1	1	1	1	1	1	1	1	1	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	12	11	11	12	9	10	12	10	10	12
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Fit Protected	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Fit Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	2976	2976	1593	1676	2976	2976	1593	1676	2976	2976	1593	1676
Fit Permitted	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	2976	2976	1593	1676	2976	2976	1593	1676	2976	2976	1593	1676
Volume (vph)	0	725	720	315	815	0	0	0	0	0	135	980
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	0	740	735	321	832	0	0	0	0	0	138	1000
RTOR Reduction (vph)	0	43	0	0	0	0	0	0	0	0	0	9
Lane Group Flow (vph)	0	1427	0	321	832	0	0	0	0	0	1200	0
Heavy Vehicles (%)	1%	1%	1%	2%	2%	2%	0%	0%	0%	0%	11%	11%
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	3	2	2	3	1	1						
Permitted Phases												
Actuated Green, G (s)	43.5	21.5	69.5									
Effective Green, g (s)	45.0	23.0	71.0									
Actuated g/C Ratio	0.45	0.23	0.71									
Clearance Time (s)	4.5	4.5	4.5									
Vehicle Extension (s)	3.0	3.0	3.0									
Lane Grp Cap (vph)	1339	366	1190									
v/s Ratio Prot	c0.46	c0.20	0.50									
v/s Ratio Perm												
v/c Ratio	1.07	0.88	0.70									
Uniform Delay, d1	27.5	37.1	8.3									
Progression Factor	0.99	1.00	1.00									
Incremental Delay, d2	43.4	24.4	1.8									
Delay (s)	67.8	61.5	10.2									
Level of Service	E	E	B									
Approach Delay (s)	67.8		24.5									
Approach LOS	E		C									
Intersection Summary												
HCM Average Control Delay	53.7											
HCM Volume to Capacity ratio	1.00											
Actuated Cycle Length (s)	100.0											
Intersection Capacity Utilization	96.7%											
Analysis Period (min)	15											
c. Critical Lane Group												

HCM Signalized Intersection Capacity Analysis 2010 Baseline Conditions - PM Peak Hour  
23: Yale St & Stewart St 500 Fifth Avenue North

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Total Lost time (s)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Util. Factor	1.00	0.85	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	1.00	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1693	1439	1593	1676	1676	1676	1477	1477	1477	1477	1477	1477
Flt Permitted	1.00	1.00	1.00	0.16	1.00	0.16	1.00	0.16	1.00	0.16	1.00	1.00
Satd. Flow (perm)	1693	1439	265	1676	1676	1676	1477	1477	1477	1477	1477	1477
Volume (vph)	0	610	110	60	5	0	0	0	0	390	900	5
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	0	649	117	64	5	0	0	0	0	415	957	5
RTOR Reduction (vph)	0	0	45	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	649	72	64	5	0	0	0	0	415	961	0
Heavy Vehicles (%)	1%	1%	1%	2%	2%	2%	0%	0%	0%	0%	10%	10%
Turn Type	3	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	3	3	3	3	3	3	3	3	3	3	3	3
Permitted Phases	43.5	43.5	43.5	43.5	43.5	43.5	47.5	47.5	47.5	47.5	47.5	47.5
Effective Green, G (s)	45.0	45.0	45.0	45.0	45.0	45.0	49.0	49.0	49.0	49.0	49.0	49.0
Actuated g/C Ratio	0.45	0.45	0.45	0.45	0.45	0.45	0.49	0.49	0.49	0.49	0.49	0.49
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	762	648	119	754	754	754	724	724	724	724	724	724
v/s Ratio Prot	0.38	0.05	0.24	0.05	0.24	0.05	0.28	0.28	0.28	0.28	0.28	0.28
v/s Ratio Perm	0.85	0.11	0.54	0.01	0.54	0.01	0.57	0.57	0.57	0.57	0.57	0.57
Uniform Delay, d1	24.5	15.9	20.0	15.2	15.2	15.2	18.1	18.1	18.1	18.1	18.1	18.1
Progression Factor	0.77	0.23	0.96	1.18	1.18	1.18	0.69	0.69	0.69	0.69	0.69	0.69
Incremental Delay, d2	6.6	0.1	3.0	0.0	0.0	0.0	0.3	0.3	0.3	0.3	0.3	0.3
Delay (s)	25.5	3.8	22.2	17.9	17.9	17.9	12.8	12.8	12.8	12.8	12.8	12.8
Level of Service	C	A	C	B	B	B	B	B	B	B	B	B
Approach Delay (s)	22.1	21.9	21.9	21.9	21.9	21.9	21.9	21.9	21.9	21.9	21.9	21.9
Approach LOS	C	C	C	C	C	C	A	A	A	A	A	A
Intersection Summary												
HCM Average Control Delay	15.5	15.5	15.5	15.5	15.5	15.5	15.5	15.5	15.5	15.5	15.5	15.5
HCM Volume to Capacity ratio	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71
Actuated Cycle Length (s)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Intersection Capacity Utilization	73.4%	73.4%	73.4%	73.4%	73.4%	73.4%	73.4%	73.4%	73.4%	73.4%	73.4%	73.4%
Analysis Period (min)	15	15	15	15	15	15	15	15	15	15	15	15
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis 2010 Baseline Conditions - PM Peak Hour  
24: Yale St & Howell St 500 Fifth Avenue North

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Total Lost time (s)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	1.00	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1593	1339	1593	1339	1339	1339	1315	1315	1315	1315	1315	1315
Flt Permitted	1.00	1.00	1.00	0.16	1.00	0.16	1.00	0.16	1.00	0.16	1.00	1.00
Satd. Flow (perm)	1593	1339	265	1339	1339	1339	1287	1287	1287	1287	1287	1287
Volume (vph)	50	935	10	0	0	0	55	840	770	0	185	5
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	52	974	10	0	0	0	57	875	802	0	193	5
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	52	984	0	0	0	0	57	932	730	0	197	0
Heavy Vehicles (%)	2%	2%	2%	0%	0%	0%	4%	4%	4%	2%	2%	2%
Parking (#/hr)	20	20	20	20	20	20	20	20	20	20	20	20
Turn Type	Split	Split	Split	Split	Split	Split	Split	Split	Split	Split	Split	Split
Protected Phases	2	2	2	2	2	2	2	2	2	2	2	2
Permitted Phases	55.0	55.0	55.0	55.0	55.0	55.0	35.0	35.0	35.0	35.0	35.0	35.0
Actuated Green, G (s)	57.0	57.0	57.0	57.0	57.0	57.0	37.0	37.0	37.0	37.0	37.0	37.0
Actuated g/C Ratio	0.57	0.57	0.57	0.57	0.57	0.57	0.37	0.37	0.37	0.37	0.37	0.37
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	908	763	908	763	763	763	1063	517	517	517	517	517
v/s Ratio Prot	0.03	0.73	0.03	0.73	0.73	0.73	0.32	0.32	0.32	0.32	0.32	0.32
v/s Ratio Perm	0.06	1.29	0.06	1.29	1.29	1.29	0.88	1.41	1.41	0.88	1.41	1.41
Uniform Delay, d1	9.6	21.5	9.6	21.5	21.5	21.5	29.4	31.5	31.5	29.4	31.5	31.5
Progression Factor	1.46	1.58	1.46	1.58	1.58	1.58	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.0	136.6	0.0	136.6	136.6	136.6	10.2	136.8	136.8	10.2	136.8	136.8
Delay (s)	14.0	170.5	14.0	170.5	170.5	170.5	39.6	228.3	228.3	39.6	228.3	228.3
Level of Service	B	F	B	F	F	F	D	F	F	D	F	F
Approach Delay (s)	162.7	162.7	162.7	162.7	162.7	162.7	126.8	126.8	126.8	126.8	126.8	126.8
Approach LOS	F	F	F	F	F	F	A	A	A	A	A	A
Intersection Summary												
HCM Average Control Delay	132.5	132.5	132.5	132.5	132.5	132.5	132.5	132.5	132.5	132.5	132.5	132.5
HCM Volume to Capacity ratio	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34
Actuated Cycle Length (s)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Intersection Capacity Utilization	115.0%	115.0%	115.0%	115.0%	115.0%	115.0%	115.0%	115.0%	115.0%	115.0%	115.0%	115.0%
Analysis Period (min)	15	15	15	15	15	15	15	15	15	15	15	15
c Critical Lane Group												

## 2010 Alternative 2/3

HCM Signalized Intersection Capacity Analysis 2010 With-Project Conditions - AM Peak Hour  
500 Fifth Avenue North  
1: Roy St & 5th Ave

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	12	12	12	11	12	11	11	11	12	11	11	12
Lane Width	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Total Lost time (s)	1.00	1.00	1.00	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Lane Util. Factor	1.00	1.00	1.00	0.98	0.98	0.98	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	0.96	0.96	0.96	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	0.99	0.99	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt	1402	1402	1402	1564	1328	1662	1432	1662	1432	1662	1432	1662
Flt Protected	0.97	0.97	0.97	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	1402	1402	1402	1564	1328	1662	1432	1662	1432	1662	1432	1662
Flt Permitted	0.97	0.97	0.97	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (perm)	1402	1402	1402	1564	1328	1662	1432	1662	1432	1662	1432	1662
Volume (vph)	0	0	0	63	40	5	372	145	57	15	230	60
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	66	42	5	392	153	60	16	242	63
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	0	0	326	272	0	16	299	0
Conf. Peds. (#/hr)	0	0	0	7	20	14	14	12	12	12	28	28
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	6%	6%	6%	5%	5%	5%
Parking (#/hr)	0	0	0	0	0	0	8	8	8	8	8	8
Turn Type	Perm	Perm	Perm	Split	Split	Split	Split	Split	Split	Split	Split	Split
Protected Phases	6	6	6	4	4	4	4	4	4	4	4	4
Permitted Phases	6	6	6	4	4	4	4	4	4	4	4	4
Actuated Green, G (s)	33.0	33.0	33.0	53.0	53.0	53.0	53.0	53.0	53.0	53.0	36.0	36.0
Effective Green, g (s)	36.0	36.0	36.0	56.0	56.0	56.0	56.0	56.0	56.0	56.0	39.0	39.0
Actuated g/C Ratio	0.26	0.26	0.26	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.28	0.28
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lane Grp Cap (vph)	361	361	361	626	531	463	531	463	399	463	399	399
v/s Ratio Prot	0.08	0.08	0.08	c0.21	0.20	0.01	c0.21	0.01	c0.21	0.01	c0.21	0.01
v/c Ratio	0.31	0.31	0.31	0.52	0.51	0.03	0.51	0.03	0.75	0.03	0.75	0.75
Uniform Delay, d1	42.0	42.0	42.0	31.8	31.7	36.8	31.7	36.8	46.0	36.8	46.0	46.0
Progression Factor	0.99	0.99	0.99	0.17	0.15	1.00	0.15	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.2	2.2	2.2	2.7	3.1	0.1	3.1	0.1	12.1	0.1	12.1	12.1
Delay (s)	43.9	43.9	43.9	8.0	7.8	36.9	7.8	36.9	58.1	36.9	58.1	58.1
Level of Service	D	D	D	A	A	A	A	A	D	A	D	D
Approach Delay (s)	43.9	43.9	43.9	7.9	7.9	57.1	7.9	57.1	57.1	57.1	57.1	57.1
Approach LOS	D	D	D	A	A	E	A	E	E	A	E	E
Intersection Summary												
HCM Average Control Delay	27.0											
HCM Volume to Capacity ratio	0.53											
Actuated Cycle Length (s)	140.0											
Intersection Capacity Utilization	54.9%											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis 2010 With-Project Conditions - AM Peak Hour  
500 Fifth Avenue North  
2: Broad St & 9th Ave

Movement	EBT	EBR	WBL	WBT	WBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	11	12	10	10	11	12	9	12
Lane Width	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Total Lost time (s)	0.95	1.00	0.95	0.95	1.00	0.91	1.00	1.00
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	0.94	1.00	0.99	1.00	0.99	1.00	0.85	1.00
Flt Protected	1.00	0.95	1.00	0.95	1.00	0.99	1.00	1.00
Satd. Flow (prot)	2854	1478	2942	2942	3759	1223	3759	1223
Flt Permitted	1.00	0.21	1.00	0.21	1.00	0.99	1.00	1.00
Satd. Flow (perm)	2854	327	2942	327	2942	3759	1223	3759
Volume (vph)	255	190	250	1891	140	170	670	123
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	271	202	266	2012	149	181	713	131
RTOR Reduction (vph)	112	0	0	0	0	0	0	0
Lane Group Flow (vph)	361	0	266	2161	0	0	894	135
Conf. Peds. (#/hr)	50	50	50	50	50	50	50	50
Heavy Vehicles (%)	3%	3%	2%	2%	2%	3%	3%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0
Parking (#/hr)	20	20	20	20	20	20	20	20
Turn Type	1	2	1	2	1	2	1	2
Protected Phases	1	2	1	2	1	2	1	2
Permitted Phases	1	2	1	2	1	2	1	2
Actuated Green, G (s)	16.5	75.0	80.5	80.5	28.5	28.5	28.5	28.5
Effective Green, g (s)	19.0	80.0	83.0	83.0	31.0	31.0	31.0	31.0
Actuated g/C Ratio	0.16	0.67	0.69	0.69	0.26	0.26	0.26	0.26
Clearance Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	452	803	2035	2035	971	316	971	316
v/s Ratio Prot	0.13	0.17	c0.73	c0.73	c0.24	0.11	c0.24	0.11
v/c Ratio Perm	0.80	0.33	1.06	1.06	0.92	0.43	0.92	0.43
Uniform Delay, d1	48.7	14.3	18.5	18.5	43.3	37.1	43.3	37.1
Progression Factor	1.00	0.22	0.20	0.20	1.00	1.00	1.00	1.00
Incremental Delay, d2	13.7	0.1	31.3	31.3	13.6	0.9	13.6	0.9
Delay (s)	62.4	3.3	35.0	35.0	56.9	38.0	56.9	38.0
Level of Service	E	A	D	D	E	D	E	D
Approach Delay (s)	62.4	31.5	31.5	31.5	54.4	54.4	54.4	54.4
Approach LOS	E	C	C	C	D	D	D	D
Intersection Summary								
HCM Average Control Delay	41.2							
HCM Volume to Capacity ratio	1.02							
Actuated Cycle Length (s)	120.0							
Intersection Capacity Utilization	87.9%							
Analysis Period (min)	15							
c Critical Lane Group								



# HCM Signalized Intersection Capacity Analysis 2010 With-Project Conditions - AM Peak Hour 3: Broad St & Westlake Ave 500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations	4T	4T	4T	4T	4T	4T	4T	4T	4T	4T
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	12	12	10	12	10	12	12	12
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00	1.00
Frpb, ped/bikes	0.98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	1.00	1.00
Fit	0.98	1.00	1.00	0.85	1.00	0.91	1.00	1.00	1.00	1.00
Fit Protected	1.00	0.95	1.00	1.00	1.00	0.95	1.00	0.95	1.00	1.00
Satd. Flow (prot)	2981	1608	3002	1439	1506	2705	1624	1710	1624	1710
Flt Permitted	0.77	0.49	1.00	1.00	0.43	1.00	0.22	1.00	0.22	1.00
Satd. Flow (perm)	2286	825	3002	1439	674	2705	378	1710	378	1710
Volume (vph)	15	340	60	265	2141	770	55	217	327	55
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	16	354	62	276	2230	802	57	226	341	57
RTOR Reduction (vph)	0	11	0	0	0	101	0	227	0	0
Lane Group Flow (vph)	0	421	0	276	2230	701	57	340	0	57
Confl. Peds. (#/hr)				50		50				
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	2%	2%	0%	0%
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	2	2	2	2	2	2	2	2	2	2
Permitted Phases	2	2	2	2	2	2	2	2	2	2
Actuated Green, G (s)	81.5	81.5	81.5	81.5	27.5	27.5	27.5	27.5	27.5	27.5
Effective Green, g (s)	84.0	84.0	84.0	84.0	30.0	30.0	30.0	30.0	30.0	30.0
Actuated g/C Ratio	0.70	0.70	0.70	0.70	0.25	0.25	0.25	0.25	0.25	0.25
Clearance Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1600	578	2101	1007	169	676	95	428	95	428
v/s Ratio Prot	0.18	0.33	0.74	0.49	0.08	0.13	0.15	0.13	0.15	0.13
v/s Ratio Perm	0.26	0.48	1.06	0.70	0.34	0.50	0.60	0.51	0.60	0.51
Uniform Delay, d1	6.6	8.1	18.0	10.5	36.9	38.6	39.7	38.7	39.7	38.7
Progression Factor	0.79	0.68	0.59	0.46	1.63	2.47	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.0	0.4	34.9	1.3	3.4	1.7	25.0	4.3	25.0	4.3
Delay (s)	5.3	5.9	45.5	6.2	63.5	96.9	64.7	43.0	64.7	43.0
Level of Service	A	A	D	A	E	F	E	D	E	D
Approach Delay (s)	5.3		32.7		93.9			47.5		47.5
Approach LOS	A		C		F			D		D
Intersection Summary										
HCM Average Control Delay	39.2			HCM Level of Service			D			
HCM Volume to Capacity ratio	0.94			Sum of lost time (s)			6.0			
Actuated Cycle Length (s)	120.0			ICU Level of Service			H			
Intersection Capacity Utilization	116.9%			Analysis Period (min)			15			
Critical Lane Group										

# HCM Signalized Intersection Capacity Analysis 2010 With-Project Conditions - AM Peak Hour 4: Valley St & Fairview Ave 500 Fifth Avenue North

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↕↕	↕	↕	↕↕	↕↕↕	↕
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	10	12	12	12	12	12
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	1.00	1.00	0.95	0.94	1.00
Flt Protected	1.00	0.85	1.00	1.00	1.00	0.85
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	2944	1411	812	3124	4491	1425
Flt Permitted	1.00	1.00	0.15	1.00	0.95	1.00
Satd. Flow (perm)	2944	1411	124	3124	4491	1425
Volume (vph)	632	20	5	708	2358	635
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	672	21	5	753	2509	676
RTOR Reduction (vph)	0	5	0	0	0	9
Lane Group Flow (vph)	672	16	5	753	2509	667
Heavy Vehicles (%)	3%	3%	100%	4%	2%	2%
Turn Type	Perm D+P+P pt+ov					
Protected Phases	4	3	3	4	2	2
Permitted Phases	4					
Actuated Green, G (s)	28.0	28.0	37.0	42.0	68.0	82.0
Effective Green, g (s)	30.0	30.0	41.0	44.0	70.0	84.0
Actuated g/C Ratio	0.25	0.25	0.34	0.37	0.58	0.70
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	736	353	105	1145	2620	998
v/s Ratio Prot	c0.23		0.00	0.24	c0.56	c0.47
v/s Ratio Perm		0.01	0.01			
v/c Ratio	0.91	0.04	0.05	0.66	0.96	0.67
Uniform Delay, d1	43.7	34.1	27.7	31.7	23.6	10.2
Progression Factor	1.31	1.47	1.00	1.00	1.26	1.33
Incremental Delay, d2	17.2	0.2	0.2	1.4	1.3	0.2
Delay (s)	74.6	50.5	27.9	33.1	31.1	13.6
Level of Service	E	D	C	C	C	B
Approach Delay (s)	73.8			33.1	27.4	
Approach LOS	E			C	C	
Intersection Summary						
HCM Average Control Delay	35.2			HCM Level of Service		
HCM Volume to Capacity ratio	0.91			D		
Actuated Cycle Length (s)	120.0			Sum of lost time (s)		
Intersection Capacity Utilization	78.2%			6.0		
Analysis Period (min)	15			ICU Level of Service		
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis 2010 With-Project Conditions - AM Peak Hour  
5: Mercer St & 1st Avenue  
500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4↑	4↑					↑	↑			↑	↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0					3.0	3.0			3.0	3.0
Lane Util. Factor	0.95	1.00					1.00	0.95			1.00	0.95
Flt	1.00	1.00					1.00	0.94			1.00	0.94
Flt Protected	1.00	1.00					1.00	0.95			1.00	0.95
Satd. Flow (prot)	3298	3298					1641	2875			1641	2875
Flt Permitted	1.00	1.00					0.95	1.00			0.95	1.00
Satd. Flow (perm)	3298	3298					1641	2875			1641	2875
Volume (vph)	40	1158	0	0	0	0	70	190	120	0	0	0
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	42	1206	0	0	0	0	73	198	125	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	47	0	0	0	0
Lane Group Flow (vph)	0	1248	0	0	0	0	73	276	0	0	0	0
Heavy Vehicles (%)	3%	3%	3%	0%	0%	0%	10%	10%	10%	0%	0%	0%
Parking (#/hr)	3	3					8	8			8	8
Turn Type	Perm	Perm					Perm	Perm			Perm	Perm
Protected Phases	1	1					2	2			2	2
Permitted Phases	1	1					2	2			2	2
Actuated Green, G (s)	45.0	45.0					26.0	26.0			26.0	26.0
Effective Green, g (s)	47.0	47.0					27.0	27.0			27.0	27.0
Actuated g/C Ratio	0.59	0.59					0.34	0.34			0.34	0.34
Clearance Time (s)	4.0	4.0					4.0	4.0			4.0	4.0
Lane Grp Cap (vph)	1938	1938					554	970			554	970
v/s Ratio Prot							0.04	0.10			0.04	0.10
v/s Ratio Perm	0.38	0.38					0.13	0.28			0.13	0.28
Uniform Delay, d1	10.9	10.9					18.4	19.4			18.4	19.4
Progression Factor	1.00	1.00					1.00	1.00			1.00	1.00
Incremental Delay, d2	1.7	1.7					0.5	0.7			0.5	0.7
Delay (s)	12.6	12.6					18.9	20.2			18.9	20.2
Level of Service	B	B					B	C			B	C
Approach Delay (s)	12.6	12.6					0.0	19.9			0.0	19.9
Approach LOS	B	B					A	B			A	B
Intersection Summary												
HCM Average Control Delay	14.4	14.4					14.4	14.4			14.4	14.4
HCM Volume to Capacity ratio	0.51	0.51					0.51	0.51			0.51	0.51
Actuated Cycle Length (s)	80.0	80.0					80.0	80.0			80.0	80.0
Intersection Capacity Utilization	54.8%	54.8%					54.8%	54.8%			54.8%	54.8%
Analysis Period (min)	15	15					15	15			15	15
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis 2010 With-Project Conditions - AM Peak Hour  
6: Mercer St & 5th Ave  
500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4↑	4↑					↑	↑			↑	↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0					3.0	3.0			3.0	3.0
Lane Util. Factor	0.86	1.00					0.91	0.91			0.91	0.91
Flt	1.00	1.00					1.00	0.92			1.00	0.92
Flt Protected	1.00	1.00					1.00	0.92			1.00	0.92
Satd. Flow (prot)	5722	5722					3069	1244			3069	1244
Flt Permitted	1.00	1.00					1.00	0.30			1.00	0.30
Satd. Flow (perm)	5722	5722					3069	1244			3069	1244
Volume (vph)	15	1145	168	0	0	0	554	249	103	210	0	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	16	1205	177	0	0	0	583	262	108	221	0	0
RTOR Reduction (vph)	0	0	38	0	0	0	0	0	163	0	0	0
Lane Group Flow (vph)	0	1221	139	0	0	0	583	99	76	253	0	0
Heavy Vehicles (%)	4%	4%	4%	0%	0%	0%	5%	5%	5%	5%	5%	5%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)	25	25					18	0	0	18	0	0
Turn Type	Perm	Perm	Perm				Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	2	2	2				8	8	8	8	8	8
Permitted Phases	2	2	2				8	8	8	8	8	8
Actuated Green, G (s)	43.0	43.0	43.0				50.0	50.0	50.0	50.0	50.0	50.0
Effective Green, g (s)	46.0	46.0	46.0				53.0	53.0	53.0	53.0	53.0	53.0
Actuated g/C Ratio	0.33	0.33	0.33				0.38	0.38	0.38	0.38	0.38	0.38
Clearance Time (s)	6.0	6.0	6.0				6.0	6.0	6.0	6.0	6.0	6.0
Lane Grp Cap (vph)	1880	1880	428				1162	471	538	1643		
v/s Ratio Prot							0.19	0.08	0.06	0.06		
v/s Ratio Perm	0.21	0.11	0.11				0.21	0.11	0.11	0.11		
Uniform Delay, d1	40.1	35.3	35.3				33.4	29.4	18.5	10.7		
Progression Factor	1.00	1.00	1.00				1.00	1.00	1.00	1.00		
Incremental Delay, d2	1.8	2.0	2.0				1.5	1.0	0.4	0.2		
Delay (s)	41.9	37.3	37.3				35.0	30.7	18.9	10.9		
Level of Service	D	D	D				C	F	D	C		
Approach Delay (s)	41.3	41.3	41.3				53.2	53.2	28.9	28.9		
Approach LOS	D	D	D				A	A	D	C		
Intersection Summary												
HCM Average Control Delay	43.6	43.6	43.6				43.6	43.6	28.9	28.9		
HCM Volume to Capacity ratio	0.46	0.46	0.46				0.46	0.46	0.46	0.46		
Actuated Cycle Length (s)	140.0	140.0	140.0				140.0	140.0	140.0	140.0		
Intersection Capacity Utilization	59.2%	59.2%	59.2%				59.2%	59.2%	59.2%	59.2%		
Analysis Period (min)	15	15	15				15	15	15	15		
c Critical Lane Group												



HCM Signalized Intersection Capacity Analysis 2010 With-Project Conditions - AM Peak Hour  
7: Mercer St & Dexter Avenue 500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBR	WBT	NBR	SBT	NEL	NER	NER2
Lane Configurations	4T1T									
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	10	11	10	12	12	12	12
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.86	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95
Fr. Protected	0.99									
Fr. Protected	0.99									
Satd. Flow (prot)	5689									
Fit Permitted	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (perm)	5689	1382	2861	1326	809	3217	1438	1341		
Volume (vph)	124	1631	130	35	175	60	235	550	25	275
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	141	1853	148	40	199	68	267	625	28	312
RTOR Reduction (vph)	0	0	0	22	0	34	0	0	0	1
Lane Group Flow (vph)	0	2142	0	18	199	34	267	625	188	159
Heavy Vehicles (%)	2%	2%	2%	7%	6%	6%	1%	1%	3%	3%
Turn Type	Perm	1	1	4	4	4	7	2	2	2
Protected Phases										
Permitted Phases	1									
Actuated Green, G (s)	60.0	60.0	30.0	30.0	48.0	48.0	48.0	14.0	14.0	14.0
Effective Green, g (s)	63.0	63.0	33.0	33.0	51.0	51.0	51.0	17.0	17.0	17.0
Actuated g/C Ratio	0.45	0.45	0.24	0.24	0.36	0.36	0.12	0.12	0.12	0.12
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lane Grp Cap (vph)	2580	622	674	313	369	1172	175	163		
v/s Ratio Prot	0.01	0.07			0.08	0.19	0.13	0.12		
v/s Ratio Perm	0.38				0.03	0.03	0.19			
v/c Ratio	0.84	0.03	0.30	0.11	0.72	0.53	1.06	0.98		
Uniform Delay, d1	34.0	21.5	43.9	42.0	36.1	35.1	61.5	61.3		
Progression Factor	0.87	1.00	1.00	1.00	1.00	1.00	1.00	1.00		
Incremental Delay, d2	3.4	0.1	1.1	0.7	1.17	1.7	85.7	64.5		
Delay (s)	32.9	21.5	45.1	42.6	47.8	36.9	147.2	125.8		
Level of Service	C	C	D	D	D	D	D	F		
Approach Delay (s)	32.9				44.4		40.1	137.3		
Approach LOS	C				D		D	F		
<b>Intersection Summary</b>										
HCM Average Control Delay		45.2							D	
HCM Volume to Capacity ratio		0.82								
Actuated Cycle Length (s)		140.0						9.0		
Intersection Capacity Utilization		77.2%							D	
Analysis Period (min)		15								
c Critical Lane Group										

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HCM Signalized Intersection Capacity Analysis 2010 With-Project Conditions - AM Peak Hour  
8: Mercer St & 9th Ave 500 Fifth Avenue North

Movement	EBT	EBR	SBL	SBT	SBR	SER
Lane Configurations	1T1T			4T		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	9	12	11
Total Lost time (s)	3.0	3.0	3.0	3.0		
Lane Util. Factor	0.86	0.91	0.91	0.91		
Frpb, ped/bikes	1.00	1.00	1.00	1.00		
Flpb, ped/bikes	1.00	0.88	0.88	0.99		
Fit Protected	0.99			1.00	0.99	
Fit Permitted	1.00	0.95	1.00			
Satd. Flow (prot)	5538	1251	2624			
Fit Permitted	1.00	0.95	1.00			
Satd. Flow (perm)	5538	1251	2624			
Volume (vph)	1961	90	465	710	30	0
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	2109	97	500	763	32	0
RTOR Reduction (vph)	5	0	6	6	0	0
Lane Group Flow (vph)	2201	0	409	874	0	0
Conf. Peds. (#/hr)			50			
Heavy Vehicles (%)	2%	2%	4%	4%	4%	0%
Bus Blockages (#/hr)	0	0	0	2	0	0
Turn Type		Perm			custom	
Protected Phases	1			21		21
Permitted Phases				2		
Actuated Green, G (s)	70.5	38.5	38.5			
Effective Green, g (s)	73.0	41.0	41.0			
Actuated g/C Ratio	0.61	0.34	0.34			
Clearance Time (s)	5.5	5.5	5.5			
Vehicle Extension (s)	3.0	3.0	3.0			
Lane Grp Cap (vph)	3369	427	897			
v/s Ratio Prot	0.40					
v/s Ratio Perm		0.33	0.33			
v/c Ratio	0.65	0.96	0.97			
Uniform Delay, d1	15.3	36.7	39.0			
Progression Factor	1.00	0.85	0.86			
Incremental Delay, d2	1.0	25.9	19.1			
Delay (s)	16.3	51.0	44.6			
Level of Service	B	D	D			
Approach Delay (s)	16.3		46.7			
Approach LOS	B		D			
<b>Intersection Summary</b>						
HCM Average Control Delay		27.5				C
HCM Volume to Capacity ratio		0.77				
Actuated Cycle Length (s)		120.0				6.0
Intersection Capacity Utilization		65.2%				C
Analysis Period (min)		15				
i Phase conflict between lane groups.						
c Critical Lane Group						

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The Transpo Group 1/17/06

HCM Signalized Intersection Capacity Analysis 2010 With-Project Conditions - AM Peak Hour  
9: Mercer St & Westlake Ave  
500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	41111											
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	12	12	12	12	12	11	12	12	12	12
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.86	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Fit	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fit Protected	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	5534	2893	1272	1624	1710	1710	2893	1272	1624	1710	1710	1710
Fit Permitted	0.99	1.00	1.00	0.95	1.00	1.00	1.00	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	5534	2893	1272	1624	1710	1710	2893	1272	1624	1710	1710	1710
Volume (vph)	289	2472	40	0	0	0	0	340	105	155	250	0
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	301	2575	42	0	0	0	0	354	109	161	260	0
RTOR Reduction (vph)	0	1	0	0	0	0	0	0	12	0	0	0
Lane Group Flow (vph)	0	2917	0	0	0	0	0	354	97	161	260	0
Heavy Vehicles (%)	2%	2%	2%	0%	0%	0%	4%	4%	4%	0%	0%	0%
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Prot	Prot	Prot
Protected Phases	4	4	4	6	6	6	6	6	6	5	5	2
Permitted Phases	4	4	4	6	6	6	6	6	6	5	5	2
Actuated Green, G (s)	76.9	17.6	17.6	8.0	32.1	32.1	17.6	17.6	8.0	32.1	32.1	32.1
Effective Green, g (s)	79.4	20.6	20.6	11.0	34.6	34.6	20.6	20.6	11.0	34.6	34.6	34.6
Actuated g/C Ratio	0.66	0.17	0.17	0.09	0.29	0.29	0.17	0.17	0.09	0.29	0.29	0.29
Clearance Time (s)	5.5	6.0	6.0	6.0	5.5	5.5	6.0	6.0	6.0	5.5	5.5	5.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	3662	497	218	149	493	493	497	218	149	493	493	493
v/s Ratio Prot	0.53	0.12	0.12	0.10	0.15	0.15	0.12	0.12	0.10	0.15	0.15	0.15
v/s Ratio Perm	0.80	0.71	0.45	1.08	0.53	0.53	0.71	0.45	1.08	0.53	0.53	0.53
Uniform Delay, d1	14.5	46.9	44.6	54.5	35.8	35.8	46.9	44.6	54.5	35.8	35.8	35.8
Progression Factor	0.98	1.11	1.16	0.93	0.98	0.98	1.11	1.16	0.93	0.98	0.98	0.98
Incremental Delay, d2	1.5	4.8	1.5	93.0	0.9	0.9	4.8	1.5	93.0	0.9	0.9	0.9
Delay (s)	9.8	56.9	53.2	143.5	36.2	36.2	56.9	53.2	143.5	36.2	36.2	36.2
Level of Service	A	E	D	F	D	D	E	D	F	D	D	D
Approach Delay (s)	9.8	56.1	56.1	77.2	77.2	77.2	56.1	56.1	77.2	77.2	77.2	77.2
Approach LOS	A	E	E	C	C	C	E	E	C	C	C	C
Intersection Summary												
HCM Average Control Delay	22.9	HCM Level of Service										
HCM Volume to Capacity ratio	0.81	C										
Actuated Cycle Length (s)	120.0	Sum of lost time (s)										
Intersection Capacity Utilization	76.7%	9.0										
Analysis Period (min)	15	D										
Critical Lane Group	Critical Lane Group											

HCM Signalized Intersection Capacity Analysis 2010 With-Project Conditions - AM Peak Hour  
10: Mercer St & Fairview Ave  
500 Fifth Avenue North

Movement	EBL	EBT	EBR	EBR2	WBL	WBR	NBL	NBT	NBR	NBR2	SBT	
Lane Configurations	4↑↑	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Ideal Flow (vphpl)	12	11	12	12	12	12	12	10	12	12	12	
Lane Width	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Total Lost time (s)	0.91	1.00	0.97	0.88	1.00	0.88	1.00	0.88	1.00	0.88	1.00	
Lane Util. Factor	1.00	0.85	1.00	0.85	1.00	0.85	1.00	0.85	1.00	0.85	1.00	
Fit	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Fit Protected	4423	1425	3120	2533	1550	2484	1413	1413	1413	1413	1413	
Satd. Flow (prot)	4423	1425	3120	2533	1550	2484	1413	1413	1413	1413	1413	
Fit Permitted	10	2027	375	140	1385	2773	245	335	10	30	30	
Satd. Flow (perm)	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	
Volume (vph)	10	2090	387	144	1428	2859	253	345	10	31	31	
Peak-hour factor, PHF	0	0	11	0	0	82	0	1	0	0	0	
Adj. Flow (vph)	0	2100	520	0	1428	2777	253	354	0	31	31	
RTOR Reduction (vph)	2%	2%	2%	2%	1%	1%	3%	3%	2%	2%	2%	
Lane Group Flow (vph)	Split	Split	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	
Heavy Vehicles (%)	1	1	1	1	1	1	1	1	1	1	1	
Turn Type	Protected Phases	Permitted Phases	Actuated Green, G (s)	Effective Green, g (s)	Actuated g/C Ratio	Clearance Time (s)	Vehicle Extension (s)	Lane Grp Cap (vph)	v/s Ratio Prot	v/s Ratio Perm	Uniform Delay, d1	
Protected Phases	11	1	1	1	1	1	1	1769	0.47	0.36	36.0	
Permitted Phases	12	12	12	12	12	12	12	570	0.47	0.36	34.0	
Actuated Green, G (s)	45.5	45.5	45.5	37.5	88.5	16.5	59.5	1040	0.46	0.10	40.0	
Effective Green, g (s)	48.0	48.0	48.0	40.0	91.0	23.0	66.0	1921	0.46	0.10	46.9	
Actuated g/C Ratio	0.40	0.40	0.40	0.33	0.76	0.19	0.55	297	0.46	0.10	14.2	
Clearance Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	271	0.46	0.10	14.2	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	1366	0.46	0.10	14.2	
Lane Grp Cap (vph)	1769	570	1040	1921	297	1366	271	1366	0.46	0.10	14.2	
v/s Ratio Prot	0.47	0.36	0.36	0.46	0.10	0.14	0.02	0.14	0.46	0.10	0.14	
v/s Ratio Perm	1.19	0.91	0.91	1.37	1.45	0.85	0.26	0.26	1.37	1.45	0.85	
Uniform Delay, d1	36.0	34.0	34.0	40.0	14.5	46.9	14.2	14.2	40.0	14.5	46.9	
Progression Factor	0.75	0.72	0.72	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	89.3	18.5	18.5	174.0	203.4	20.3	0.1	0.1	174.0	203.4	20.3	
Delay (s)	116.4	43.0	43.0	214.0	217.9	67.2	14.3	14.3	214.0	217.9	67.2	
Level of Service	F	D	D	F	F	E	B	B	F	E	D	
Approach Delay (s)	101.6	43.0	43.0	36.3	36.3	45.2	45.2	45.2	36.3	36.3	45.2	
Approach LOS	F	D	D	C	C	D	D	D	C	C	D	
Intersection Summary												
HCM Average Control Delay	161.4	HCM Level of Service										
HCM Volume to Capacity ratio	1.33	F										
Actuated Cycle Length (s)	120.0	Sum of lost time (s)										
Intersection Capacity Utilization	175.9%	6.0										
Analysis Period (min)	15	H										
1. Phase conflict between lane groups.												
Critical Lane Group												

HCM Signalized Intersection Capacity Analysis 2010 With-Project Conditions - AM Peak Hour  
11: Republican St & 5th Ave 500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4	4	4	4	4	4	4	4	4	4	4	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	0.95	1.00	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Frpb, ped/bikes	1.00	0.97	1.00	0.98	1.00	0.98	1.00	0.99	1.00	0.99	1.00	0.99
Flpb, ped/bikes	0.97	1.00	1.00	0.74	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99
Flt	1.00	0.85	1.00	0.96	1.00	0.96	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.96	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1218	1079	1209	4403	1610	3233	1610	3233	1610	3233	1610	3233
Flt Permitted	0.96	1.00	0.56	1.00	0.25	1.00	0.25	1.00	0.25	1.00	0.25	1.00
Satd. Flow (perm)	1218	1079	709	4403	426	3233	426	3233	426	3233	426	3233
Volume (vph)	0	0	0	21	15	746	278	38	310	5	5	5
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	0	0	0	21	15	761	284	39	316	5	5	5
RTOR Reduction (vph)	0	0	0	0	10	0	21	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	26	2	15	1024	0	39	321	0	0
Confl. Peds. (#/hr)	10	20	20	10	75	20	20	20	20	20	75	75
Heavy Vehicles (%)	0%	0%	0%	33%	33%	7%	7%	7%	7%	7%	7%	7%
Parking (#/hr)	8	8	8	8	8	8	8	8	8	8	8	8
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	2	2	2	2	2	2	2	2	2	2	2	2
Permitted Phases	2	2	2	2	2	2	2	2	2	2	2	2
Actuated Green, G (s)	20.0	20.0	109.0	109.0	109.0	109.0	109.0	109.0	109.0	109.0	109.0	109.0
Effective Green, g (s)	22.0	22.0	112.0	112.0	112.0	112.0	112.0	112.0	112.0	112.0	112.0	112.0
Actuated g/C Ratio	0.16	0.16	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Clearance Time (s)	5.0	5.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	191	170	567	3522	341	2586	341	2586	341	2586	341	2586
v/s Ratio Prot	0.02	0.00	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
v/c Ratio	0.14	0.01	0.03	0.29	0.11	0.12	0.11	0.12	0.11	0.12	0.11	0.12
Uniform Delay, d1	50.8	49.8	2.9	3.6	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1
Progression Factor	1.00	1.00	0.35	0.46	0.18	0.20	0.18	0.20	0.18	0.20	0.18	0.20
Incremental Delay, d2	0.3	0.0	0.1	0.2	0.7	0.1	0.7	0.1	0.7	0.1	0.7	0.1
Delay (s)	51.1	49.8	1.1	1.9	1.2	0.7	1.2	0.7	1.2	0.7	1.2	0.7
Level of Service	D	D	A	A	A	A	A	A	A	A	A	A
Approach Delay (s)	50.7	49.8	1.1	1.9	1.2	0.7	1.2	0.7	1.2	0.7	1.2	0.7
Approach LOS	A	A	A	A	A	A	A	A	A	A	A	A
Intersection Summary												
HCM Average Control Delay	2.9											
HCM Volume to Capacity ratio	0.27											
Actuated Cycle Length (s)	140.0											
Intersection Capacity Utilization	49.0%											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis 2010 With-Project Conditions - AM Peak Hour  
12: Harrison St & 5th Ave 500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4	4	4	4	4	4	4	4	4	4	4	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	1.00	1.00	1.00	0.88	1.00	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Frpb, ped/bikes	1.00	0.87	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	0.78	1.00	0.92	1.00	1.00	1.00	1.00	1.00	1.00
Flt	1.00	0.92	1.00	0.85	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.95	1.00	0.96	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1887	1421	1369	2720	1355	2926	1355	2926	1355	2926	1355	2926
Flt Permitted	0.89	1.00	0.79	1.00	0.52	1.00	0.52	1.00	0.52	1.00	0.52	1.00
Satd. Flow (perm)	1229	1421	1130	2720	737	2926	737	2926	737	2926	737	2926
Volume (vph)	5	5	5	50	10	527	10	492	5	5	5	5
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	5	5	5	55	11	579	11	541	5	5	5	5
RTOR Reduction (vph)	0	4	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	5	6	0	66	579	11	546	0	0	0	379	0
Confl. Peds. (#/hr)	100	100	100	100	185	115	115	115	115	115	185	185
Heavy Vehicles (%)	7%	7%	7%	1%	1%	1%	1%	1%	1%	1%	8%	8%
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	2	2	2	2	2	2	2	2	2	2	2	2
Permitted Phases	2	2	2	2	2	2	2	2	2	2	2	2
Actuated Green, G (s)	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0
Effective Green, g (s)	34.0	34.0	34.0	34.0	34.0	34.0	34.0	34.0	34.0	34.0	34.0	34.0
Actuated g/C Ratio	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	298	345	274	661	526	2090	526	2090	274	661	526	2090
v/s Ratio Prot	0.00	0.00	0.00	0.06	0.01	0.01	0.06	0.01	0.06	0.01	0.01	0.01
v/c Ratio	0.02	0.02	0.02	0.24	0.88	0.02	0.26	0.88	0.02	0.26	0.88	0.02
Uniform Delay, d1	40.3	40.3	40.3	42.6	51.0	5.8	7.0	51.0	42.6	51.0	5.8	7.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	0.12	0.09	1.00	1.00	1.00	0.12	0.09
Incremental Delay, d2	0.0	0.0	0.0	0.5	12.5	0.1	0.3	12.5	0.5	12.5	0.1	0.3
Delay (s)	40.3	40.3	40.3	43.1	63.4	0.7	1.0	63.4	43.1	63.4	0.7	1.0
Level of Service	D	D	D	D	E	A	A	E	D	E	A	A
Approach Delay (s)	40.3	40.3	40.3	61.3	61.3	0.7	1.0	61.3	61.3	61.3	0.7	1.0
Approach LOS	D	D	D	E	E	A	A	E	D	E	A	A
Intersection Summary												
HCM Average Control Delay	26.7											
HCM Volume to Capacity ratio	0.42											
Actuated Cycle Length (s)	140.0											
Intersection Capacity Utilization	55.3%											
Analysis Period (min)	15											
c Critical Lane Group												

# HCM Unsignalized Intersection Capacity Analysis 2010 With-Project Conditions - AM Peak Hour 13: Harrison St & Broad St

500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Sign Control	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Grade	0	0	5	0	0	0	0	0	0	0	0	0
Volume (veh/h)	0	0	0	0	0	0	0	0	0	0	0	0
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Hourly flow rate (vph)	0	0	6	0	0	0	0	0	0	0	0	0
Pedestrians	20											
Lane Width (ft)	11.0											
Walking Speed (ft/s)	4.0											
Percent Blockage	2											
Right turn flare (veh)												
Median type	None											
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
VC, conflicting volume	1932	2115	1070	1042	2477	180	2120					
VC1, stage 1 conf vol												
VC2, stage 2 conf vol												
vCu, unblocked vol	1932	2115	1070	1042	2477	180	2120					
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1					
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2					
p0 queue free %	100	100	97	100	100	100	100					
cM capacity (veh/h)	40	51	217	180	30	838	253					
Direction, Lane #	EB1	WB1	NE1	NE2	SW1	SW2						
Volume Total	6	0	236	124	914	1186						
Volume Left	0	0	0	0	0	0						
Volume Right	6	0	0	0	0	0						
cSH	217	1700	1700	1700	1700	1700						
Volume to Capacity	0.03	0.00	0.14	0.07	0.54	0.70						
Queue Length 95th (ft)	2	0	0	0	0	0						
Control Delay (s)	22.0	0.0	0.0	0.0	0.0	0.0						
Lane LOS	C	A										
Approach Delay (s)	22.0	0.0	0.0	0.0	0.0	0.0						
Approach LOS	C	A										

<b>Intersection Summary</b>												
Average Delay	0.1											
Intersection Capacity Utilization	65.2%											
Analysis Period (min)	15											

# HCM Signalized Intersection Capacity Analysis 2010 With-Project Conditions - AM Peak Hour 14: 5th Ave & Broad St

500 Fifth Avenue North

Movement	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations	12	11	12	12	11	11	11	11	11	12	11	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	12	12	11	11	11	11	11	12	11	12
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Frpb, ped/bikes	0.99	1.00	0.75	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fit	0.99	1.00	0.85	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fit Protected	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	3168	3298	1550	1586	3172	1631	3255					
Fit Permitted	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (perm)	3168	3298	1550	1586	3172	1631	3255					
Volume (vph)	0	353	30	0	327	79	149	285	0	95	1090	5
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	0	357	30	0	330	80	151	288	0	96	1101	5
RTOR Reduction (vph)	0	5	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	382	0	0	330	80	151	288	0	96	1106	0
Conf. Peds. (#/hr)	115	85	85	115	130	45	45	130	7	7	130	7
Heavy Vehicles (%)	3%	3%	3%	2%	2%	10%	10%	10%	10%	7%	7%	7%
Bus Blockages (#/hr)	0	20	0	0	18	0	0	0	0	0	0	0
Turn Type												
Protected Phases	8			4		5	2			1		6
Permitted Phases												
Actuated Green, G (s)	43.0	43.0	43.0	43.0	29.0	47.0	29.0	47.0		29.0	47.0	
Effective Green, g (s)	49.0	49.0	49.0	49.0	32.0	50.0	32.0	50.0		32.0	50.0	
Actuated g/C Ratio	0.35	0.35	0.35	0.35	0.23	0.36	0.23	0.36		0.23	0.36	
Clearance Time (s)	9.0	9.0	9.0	9.0	6.0	6.0	6.0	6.0		6.0	6.0	
Lane Grp Cap (vph)	1109	1154	403	363	1133	373	1163					
v/s Ratio Prot	c0.12	0.10		c0.10	0.09		0.06	c0.34				
v/s Ratio Perm					0.07							
v/c Ratio	0.34	0.29	0.20	0.42	0.25	0.26	0.26	0.95				
Uniform Delay, d1	33.6	32.9	31.8	46.0	31.8	44.3	43.8					
Progression Factor	1.06	0.99	1.00	0.98	0.90	1.00	1.00					
Incremental Delay, d2	0.9	0.6	1.1	3.5	0.5	1.7	17.0					
Delay (s)	36.5	33.0	32.7	48.5	29.2	45.9	60.8					
Level of Service	D	C	C	D	C	D	E					
Approach Delay (s)	36.5	33.0		33.0		35.9	59.6					
Approach LOS	D	C		C		D	E					

<b>Intersection Summary</b>												
HCM Average Control Delay	47.2											
HCM Volume to Capacity ratio	0.59											
Actuated Cycle Length (s)	140.0											
Intersection Capacity Utilization	65.2%											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis 2010 With-Project Conditions - AM Peak Hour  
15: Denny Way & 1st Avenue

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SBL	SBR	NWL	NWR
Lane Configurations	↕↕↕↕↕↕↕↕↕↕↕									
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0			3.0			3.0		3.0	3.0
Lane Util. Factor	0.95			0.91			0.95		1.00	0.95
Fit	0.98			0.96			1.00		1.00	0.95
Fit Protected	1.00			1.00			0.95		1.00	1.00
Satd. Flow (prot)	3444			4796			1464		1464	1189
Fit Permitted	1.00			1.00			0.95		1.00	1.00
Satd. Flow (perm)	3444			4796			1464		1464	1189
Volume (vph)	0	1943	255	0	932	320	0	0	160	10
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	0	2003	263	0	961	330	0	0	165	10
RTOR Reduction (vph)	0	10	0	0	62	0	0	0	0	0
Lane Group Flow (vph)	0	2256	0	0	1229	0	0	0	165	10
Heavy Vehicles (%)	3%	3%	3%	4%	4%	4%	0%	0%	11%	11%
Parking (#/hr)									0	8
Turn Type	Prot									
Protected Phases	1									
Permitted Phases	2									
Actuated Green, G (s)	69.0									
Effective Green, g (s)	71.0									
Actuated g/C Ratio	0.71									
Clearance Time (s)	5.0									
Lane Grp Cap (vph)	2445									
v/s Ratio Prot	c0.66									
v/s Ratio Perm	0.26									
v/c Ratio	0.92									
Uniform Delay, d1	12.2									
Progression Factor	1.00									
Incremental Delay, d2	7.3									
Delay (s)	19.5									
Level of Service	B									
Approach Delay (s)	19.5									
Approach LOS	B									
Intersection Summary										
HCM Average Control Delay	15.6									
HCM Volume to Capacity ratio	0.82									
Actuated Cycle Length (s)	100.0									
Intersection Capacity Utilization	84.3%									
Analysis Period (min)	15									
Critical Lane Group										

HCM Signalized Intersection Capacity Analysis 2010 With-Project Conditions - AM Peak Hour  
16: Denny Way & Broad St

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Ideal Flow (Vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	12	12	11	12	12	10	12	12	10	9
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fit	1.00	1.00	1.00	1.00	1.00	1.00	0.99	1.00	0.99	1.00	0.85	1.00
Fit Protected	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	3358	3358	3284	3284	3148	3148	3303	3361	3303	3361	1.00	1.00
Flt Permitted	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (perm)	3358	3358	3121	3121	3148	3148	3303	3361	3303	3361	1.00	1.00
Volume (vph)	0	1110	5	5	985	5	0	379	35	0	552	517
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	1168	5	5	1037	5	0	399	37	0	581	544
RTOR Reduction (vph)	0	0	0	0	0	0	0	7	0	0	0	48
Lane Group Flow (vph)	0	1173	0	0	1047	0	0	429	0	0	581	496
Conf. Peds. (#/hr)	22	12	12	12	22	18	34	34	34	34	18	18
Heavy Vehicles (%)	3%	3%	3%	4%	4%	4%	5%	5%	5%	2%	2%	2%
Bus Blockages (#/hr)	0	4	0	0	10	0	0	0	0	0	0	0
Turn Type	Perm											
Protected Phases	1	2										
Permitted Phases	1											
Actuated Green, G (s)	53.0	53.0										
Effective Green, g (s)	55.0	55.0										
Actuated g/C Ratio	0.55	0.55										
Clearance Time (s)	5.0	5.0										
Lane Grp Cap (vph)	1847	1717										
v/s Ratio Prot	60.35	0.34										
v/s Ratio Perm	0.63	0.61										
v/c Ratio	0.56	0.53										
Uniform Delay, d1	15.6	15.2										
Progression Factor	0.53	0.84										
Incremental Delay, d2	0.6	1.5										
Delay (s)	8.8	14.4										
Level of Service	A	B										
Approach Delay (s)	8.8	14.4										
Approach LOS	A	B										
Intersection Summary												
HCM Average Control Delay	20.8	HCM Level of Service										
HCM Volume to Capacity ratio	0.76	C										
Actuated Cycle Length (s)	100.0	Sum of lost time (s)										
Intersection Capacity Utilization	68.0%	ICU Level of Service										
Analysis Period (min)	15	C										
Critical Lane Group												



HCM Signalized Intersection Capacity Analysis 2010 With-Project Conditions - AM Peak Hour  
17: Denny Way & 5th Ave 500 Fifth Avenue North

Movement	EBL	EBT	EBR	EBR2	WBT	WBR	NBL	NBT	NBR	NBR2	SBL2	SBL
Lane Configurations	↑↑	↑↑			↑↑	↑↑		4↑				
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	12	12	10	12	12	10	12	12	11	12
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	1.00
Frpb, ped/bikes	0.99	0.99	0.99	0.99	0.99	0.99	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	1.00
Flt Protected	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95
Satd. Flow (prot)	3174	3174	3059	3059	2897	2897	1752	1752	1752	1752	1752	1752
Flt Permitted	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95
Satd. Flow (perm)	3019	3019	3059	3059	2897	2897	1752	1752	1752	1752	1752	1752
Volume (vph)	5	710	370	10	755	283	5	60	15	15	63	202
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	5	747	389	11	795	298	5	63	16	16	66	213
RTOR Reduction (vph)	0	0	0	0	32	0	0	15	0	0	0	0
Lane Group Flow (vph)	0	1152	0	0	1061	0	0	85	0	0	0	279
Confl. Peds. (#/hr)	23	23	8	8	23	17	23	17	8	8	23	17
Heavy Vehicles (%)	2%	2%	2%	2%	4%	4%	8%	8%	8%	8%	3%	3%
Bus Blockages (#/hr)	0	4	0	0	2	0	0	11	0	0	0	0
Turn Type	Perm	Perm	Perm	Split	Split	Split	Split	Split	Split	Split	Split	Split
Protected Phases	1	1	1	1	1	1	3	3	3	3	2	2
Permitted Phases	1	1	1	1	1	1	3	3	3	3	2	2
Actuated Green, G (s)	58.9	58.9	58.9	58.9	58.9	58.9	7.1	7.1	7.1	7.1	19.0	19.0
Effective Green, g (s)	60.9	60.9	60.9	60.9	60.9	60.9	9.1	9.1	9.1	9.1	21.0	21.0
Actuated g/C Ratio	0.61	0.61	0.61	0.61	0.61	0.61	0.09	0.09	0.09	0.09	0.21	0.21
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1839	1839	1863	1863	1863	264	264	264	264	264	368	368
v/s Ratio Prot	c0.38	c0.38	0.35	0.35	0.35	c0.03	c0.03	c0.03	c0.16	c0.16	c0.16	c0.16
v/s Ratio Perm	0.63	0.63	0.57	0.57	0.57	0.32	0.32	0.32	0.76	0.76	0.76	0.76
Uniform Delay, d1	12.4	12.4	11.7	11.7	11.7	42.6	42.6	42.6	37.1	37.1	37.1	37.1
Progression Factor	0.14	0.14	0.92	0.92	0.92	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.4	1.4	1.2	1.2	1.2	0.7	0.7	0.7	8.7	8.7	8.7	8.7
Delay (s)	3.1	3.1	12.0	12.0	12.0	43.3	43.3	43.3	45.8	45.8	45.8	45.8
Level of Service	A	A	B	B	B	D	D	D	D	D	D	D
Approach Delay (s)	3.1	3.1	12.0	12.0	12.0	43.3	43.3	43.3				
Approach LOS	A	A	B	B	B	D	D	D				
Intersection Summary												
HCM Average Control Delay	13.8											
HCM Volume to Capacity ratio	0.63											
Actuated Cycle Length (s)	100.0											
Intersection Capacity Utilization	63.8%											
Analysis Period (min)	15											
Critical Lane Group												

HCM Signalized Intersection Capacity Analysis 2010 With-Project Conditions - AM Peak Hour  
17: Denny Way & 5th Ave 500 Fifth Avenue North

Movement	SBT	SBR
Lane Configurations	1	1
Ideal Flow (vphpl)	1900	1900
Lane Width	13	12
Total Lost time (s)	3.0	3.0
Lane Util. Factor	1.00	1.00
Frpb, ped/bikes	0.99	0.99
Flpb, ped/bikes	1.00	1.00
Flt	0.98	0.98
Flt Protected	1.00	1.00
Satd. Flow (prot)	1856	1856
Flt Permitted	1.00	1.00
Satd. Flow (perm)	1856	1856
Volume (vph)	95	15
Peak-hour factor, PHF	0.95	0.95
Adj. Flow (vph)	100	16
RTOR Reduction (vph)	6	0
Lane Group Flow (vph)	110	0
Confl. Peds. (#/hr)	17	17
Heavy Vehicles (%)	3%	3%
Bus Blockages (#/hr)	0	0
Turn Type	Prot	Prot
Protected Phases	2	2
Permitted Phases	2	2
Actuated Green, G (s)	19.0	19.0
Effective Green, g (s)	21.0	21.0
Actuated g/C Ratio	0.21	0.21
Clearance Time (s)	5.0	5.0
Vehicle Extension (s)	3.0	3.0
Lane Grp Cap (vph)	390	390
v/s Ratio Prot	0.06	0.06
v/s Ratio Perm	0.28	0.28
Uniform Delay, d1	33.2	33.2
Progression Factor	1.00	1.00
Incremental Delay, d2	0.4	0.4
Delay (s)	33.6	33.6
Level of Service	C	C
Approach Delay (s)	42.2	42.2
Approach LOS	D	D
Intersection Summary		

HCM Signalized Intersection Capacity Analysis 2010 With-Project Conditions - AM Peak Hour  
18: Denny Way & Aurora Ave  
500 Fifth Avenue North

Movement	EBT	EBR	EBR2	WBT	WBR	NBT	NBR	NBR2	SBL2	SBL	SBT	SBT
Lane Configurations	11	12	11	12	11	12	12	12	12	12	12	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	11	12	11	12	12	12	12	12	12	12
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Flt Protected	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Flt Permitted	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	3019	3019	3019	3019	3019	3019	3019	3019	3019	3019	3019	3019
Satd. Flow (perm)	3019	3019	3019	3019	3019	3019	3019	3019	3019	3019	3019	3019
Volume (vph)	938	135	5	995	145	295	65	5	340	165	0	825
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	987	142	5	1047	153	311	68	5	358	174	0	868
RTOR Reduction (vph)	0	0	0	11	0	0	0	0	0	0	0	2
Lane Group Flow (vph)	1134	0	0	1189	0	384	0	0	532	442	440	0
Heavy Vehicles (%)	2%	2%	2%	4%	4%	2%	2%	2%	3%	3%	3%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	4	0
Turn Type	Protected Phases	2	2	4	4	4	4	4	3	3	8	8
Permitted Phases	Permitted Phases	30.1	30.1	16.9	16.9	16.9	16.9	16.9	34.0	55.9	55.9	55.9
Effective Green, G (s)	36.1	36.1	36.1	18.9	18.9	18.9	18.9	18.9	36.0	57.9	57.9	57.9
Actuated g/C Ratio	0.36	0.36	0.36	0.19	0.19	0.19	0.19	0.19	0.36	0.58	0.58	0.58
Clearance Time (s)	9.0	9.0	9.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1090	1089	1089	585	585	585	585	585	568	764	776	776
v/s Ratio Prot	0.38	c0.40	c0.40	c0.12	c0.12	c0.12	c0.12	c0.12	c0.34	0.34	0.33	0.33
v/s Ratio Perm	1.04	1.11	1.11	0.66	0.66	0.66	0.66	0.66	0.94	0.58	0.57	0.57
Uniform Delay, d1	31.9	31.9	31.9	37.5	37.5	37.5	37.5	37.5	30.9	13.3	13.2	13.2
Progression Factor	1.17	0.61	0.61	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	37.9	61.4	61.4	2.7	2.7	2.7	2.7	2.7	23.0	1.1	1.0	1.0
Delay (s)	75.2	81.0	81.0	40.2	40.2	40.2	40.2	40.2	53.9	14.4	14.2	14.2
Level of Service	E	F	F	D	D	D	D	D	D	B	B	B
Approach Delay (s)	75.2	81.0	81.0	40.2	40.2	40.2	40.2	40.2	53.9	14.4	14.2	14.2
Approach LOS	E	F	F	D	D	D	D	D	D	B	B	B
Intersection Summary												
HCM Average Control Delay	57.9											
HCM Volume to Capacity ratio	0.95											
Actuated Cycle Length (s)	100.0											
Intersection Capacity Utilization	88.3%											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis 2010 With-Project Conditions - AM Peak Hour  
18: Denny Way & Aurora Ave  
500 Fifth Avenue North

Movement	EBT	EBR	EBR2	WBT	WBR	NBT	NBR	NBR2	SBL2	SBL	SBT	SBT
Lane Configurations	11	12	11	12	11	12	12	12	12	12	12	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	11	12	11	12	12	12	12	12	12	12
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Flt Protected	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Flt Permitted	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	3019	3019	3019	3019	3019	3019	3019	3019	3019	3019	3019	3019
Satd. Flow (perm)	3019	3019	3019	3019	3019	3019	3019	3019	3019	3019	3019	3019
Volume (vph)	938	135	5	995	145	295	65	5	340	165	0	825
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	987	142	5	1047	153	311	68	5	358	174	0	868
RTOR Reduction (vph)	0	0	0	11	0	0	0	0	0	0	0	2
Lane Group Flow (vph)	1134	0	0	1189	0	384	0	0	532	442	440	0
Heavy Vehicles (%)	2%	2%	2%	4%	4%	2%	2%	2%	3%	3%	3%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	4	0
Turn Type	Protected Phases	2	2	4	4	4	4	4	3	3	8	8
Permitted Phases	Permitted Phases	30.1	30.1	16.9	16.9	16.9	16.9	16.9	34.0	55.9	55.9	55.9
Effective Green, G (s)	36.1	36.1	36.1	18.9	18.9	18.9	18.9	18.9	36.0	57.9	57.9	57.9
Actuated g/C Ratio	0.36	0.36	0.36	0.19	0.19	0.19	0.19	0.19	0.36	0.58	0.58	0.58
Clearance Time (s)	9.0	9.0	9.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1090	1089	1089	585	585	585	585	585	568	764	776	776
v/s Ratio Prot	0.38	c0.40	c0.40	c0.12	c0.12	c0.12	c0.12	c0.12	c0.34	0.34	0.33	0.33
v/s Ratio Perm	1.04	1.11	1.11	0.66	0.66	0.66	0.66	0.66	0.94	0.58	0.57	0.57
Uniform Delay, d1	31.9	31.9	31.9	37.5	37.5	37.5	37.5	37.5	30.9	13.3	13.2	13.2
Progression Factor	1.17	0.61	0.61	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	37.9	61.4	61.4	2.7	2.7	2.7	2.7	2.7	23.0	1.1	1.0	1.0
Delay (s)	75.2	81.0	81.0	40.2	40.2	40.2	40.2	40.2	53.9	14.4	14.2	14.2
Level of Service	E	F	F	D	D	D	D	D	D	B	B	B
Approach Delay (s)	75.2	81.0	81.0	40.2	40.2	40.2	40.2	40.2	53.9	14.4	14.2	14.2
Approach LOS	E	F	F	D	D	D	D	D	D	B	B	B
Intersection Summary												
HCM Average Control Delay	57.9											
HCM Volume to Capacity ratio	0.95											
Actuated Cycle Length (s)	100.0											
Intersection Capacity Utilization	88.3%											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis 2010 With-Project Conditions - AM Peak Hour  
19: Denny Way & Dexter Avenue  
500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4T	1T	1T	1T	1T	1T	1T	1T	1T	1T	1T	1T
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Fit	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fit Protected	3207	3149	3149	3149	3149	3149	3149	3149	3149	3149	3149	3149
Satd. Flow (prot)	0.79	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (perm)	2532	3149	3149	3149	3149	3149	3149	3149	3149	3149	3149	3149
Volume (vph)	65	1193	5	0	927	75	5	85	5	150	295	233
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	71	1297	5	0	1008	82	5	92	5	163	321	253
RTOR Reduction (vph)	0	0	0	0	5	0	0	4	0	0	0	195
Lane Group Flow (vph)	0	1373	0	0	1085	0	5	93	0	163	321	58
Heavy Vehicles (%)	1%	1%	1%	2%	2%	2%	20%	20%	20%	2%	2%	2%
Turn Type	pm+pt											
Protected Phases	2	5			1			3				3
Permitted Phases	5				3			3				3
Actuated Green, G (s)	67.9	50.0	20.1	20.1	50.0	20.1	20.1	20.1	20.1	20.1	20.1	20.1
Effective Green, g (s)	70.9	53.0	23.1	23.1	53.0	23.1	23.1	23.1	23.1	23.1	23.1	23.1
Actuated g/C Ratio	0.71	0.53	0.23	0.23	0.53	0.23	0.23	0.23	0.23	0.23	0.23	0.23
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1896	1669	144	621	1669	144	621	144	621	1669	144	621
vis Ratio Prot	c0.11	0.34			0.34			0.03		0.10		0.04
vis Ratio Perm	c0.41									c0.14		0.18
v/c Ratio	0.72	0.65	0.03	0.15	0.65	0.03	0.15	0.03	0.15	0.61	0.44	0.18
Uniform Delay, d1	8.7	16.9	29.8	30.6	16.9	29.8	30.6	34.4	32.9	30.8		
Progression Factor	0.60	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		
Incremental Delay, d2	0.3	2.0	0.1	0.1	2.0	0.1	0.1	4.1	0.4	0.3		
Delay (s)	5.5	18.8	29.9	30.7	18.8	29.9	30.7	38.5	33.3	31.1		
Level of Service	A	B	C	C	B	C	C	D	C	C		
Approach Delay (s)	5.5	18.8			18.8			30.7		33.7		
Approach LOS	A	B			B			C		C		
Intersection Summary												
HCM Average Control Delay												
HCM Volume to Capacity ratio												
Actuated Cycle Length (s)												
Intersection Capacity Utilization												
Analysis Period (min)												
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis 2010 With-Project Conditions - AM Peak Hour  
20: Denny Way & Westlake Ave  
500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4T	1T	1T	1T	1T	1T	1T	1T	1T	1T	1T	1T
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Fit	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fit Protected	3207	3149	3149	3149	3149	3149	3149	3149	3149	3149	3149	3149
Satd. Flow (prot)	0.79	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (perm)	2532	3149	3149	3149	3149	3149	3149	3149	3149	3149	3149	3149
Volume (vph)	65	1193	5	0	927	75	5	85	5	150	295	233
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	71	1297	5	0	1008	82	5	92	5	163	321	253
RTOR Reduction (vph)	0	0	0	0	5	0	0	4	0	0	0	195
Lane Group Flow (vph)	0	1373	0	0	1085	0	5	93	0	163	321	58
Heavy Vehicles (%)	1%	1%	1%	2%	2%	2%	20%	20%	20%	2%	2%	2%
Turn Type	pm+pt											
Protected Phases	2	5			1			3				3
Permitted Phases	5				3			3				3
Actuated Green, G (s)	67.9	50.0	20.1	20.1	50.0	20.1	20.1	20.1	20.1	20.1	20.1	20.1
Effective Green, g (s)	70.9	53.0	23.1	23.1	53.0	23.1	23.1	23.1	23.1	23.1	23.1	23.1
Actuated g/C Ratio	0.71	0.53	0.23	0.23	0.53	0.23	0.23	0.23	0.23	0.23	0.23	0.23
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1896	1669	144	621	1669	144	621	144	621	1669	144	621
vis Ratio Prot	c0.11	0.34			0.34			0.03		0.10		0.04
vis Ratio Perm	c0.41									c0.14		0.18
v/c Ratio	0.72	0.65	0.03	0.15	0.65	0.03	0.15	0.03	0.15	0.61	0.44	0.18
Uniform Delay, d1	8.7	16.9	29.8	30.6	16.9	29.8	30.6	34.4	32.9	30.8		
Progression Factor	0.60	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		
Incremental Delay, d2	0.3	2.0	0.1	0.1	2.0	0.1	0.1	4.1	0.4	0.3		
Delay (s)	5.5	18.8	29.9	30.7	18.8	29.9	30.7	38.5	33.3	31.1		
Level of Service	A	B	C	C	B	C	C	D	C	C		
Approach Delay (s)	5.5	18.8			18.8			30.7		33.7		
Approach LOS	A	B			B			C		C		
Intersection Summary												
HCM Average Control Delay												
HCM Volume to Capacity ratio												
Actuated Cycle Length (s)												
Intersection Capacity Utilization												
Analysis Period (min)												
c Critical Lane Group												



HCM Signalized Intersection Capacity Analysis 2010 With-Project Conditions - AM Peak Hour  
21: Denny Way & Fairview Ave

500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	11	11	12	11	11	12	9	10	12	10	10	12
Lane Width	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Total Lost time (s)	1.00	0.95	1.00	0.95	1.00	0.95	0.97	0.95	1.00	0.95	1.00	0.95
Lane Util. Factor	1.00	1.00	1.00	0.98	1.00	0.97	1.00	0.97	1.00	0.95	1.00	0.95
Flt Protected	1.00	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Satd. Flow (prot)	1555	3098	1540	3012	2781	2896	1458	2772	1458	2772	1458	2772
Flt Permitted	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	1555	3098	1540	3012	2781	2896	1458	2772	1458	2772	1458	2772
Volume (vph)	140	771	20	40	849	145	363	290	60	100	325	180
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	149	820	21	43	903	154	386	309	64	106	346	170
RTOR Reduction (vph)	0	2	0	0	14	0	0	19	0	0	64	0
Lane Group Flow (vph)	149	839	0	43	1043	0	386	354	0	106	452	0
Heavy Vehicles (%)	1%	1%	1%	2%	2%	2%	2%	2%	2%	4%	4%	4%
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	1	6	5	2	3	8	7	4				
Permitted Phases												
Actuated Green, G (s)	11.5	39.5	5.2	33.2	14.8	26.6	8.7	20.5				
Effective Green, g (s)	13.5	41.5	7.2	35.2	16.8	28.6	10.7	22.5				
Actuated g/C Ratio	0.14	0.42	0.07	0.35	0.17	0.29	0.11	0.22				
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0				
Lane Grp Cap (vph)	210	1286	111	1080	467	828	156	624				
v/s Ratio Prot	c0.10	0.27	0.03	c0.35	c0.14	0.12	0.07	c0.16				
v/s Ratio Perm												
v/c Ratio	0.71	0.65	0.39	0.98	0.83	0.43	0.68	0.73				
Uniform Delay, d1	41.4	23.5	44.3	32.1	40.2	29.0	43.0	35.9				
Progression Factor	1.00	1.00	1.15	0.95	1.00	1.00	1.11	0.76				
Incremental Delay, d2	10.5	2.6	1.4	18.3	11.4	0.4	10.1	3.7				
Delay (s)	51.8	26.1	52.4	49.0	51.6	29.4	57.7	31.0				
Level of Service	D	C	D	D	D	C	E	C				
Approach Delay (s)	29.9			49.1		40.7		35.5				
Approach LOS	C			D		D		D				
Intersection Summary												
HCM Average Control Delay	39.4											
HCM Volume to Capacity ratio	0.85											
Actuated Cycle Length (s)	100.0											
Intersection Capacity Utilization	80.3%											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis 2010 With-Project Conditions - AM Peak Hour  
22: Denny Way & Stewart St

500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	11	11	12	11	11	12	9	10	12	10	10	12
Lane Width	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Total Lost time (s)	1.00	0.95	1.00	0.95	1.00	0.95	0.97	0.95	1.00	0.95	1.00	0.95
Lane Util. Factor	1.00	1.00	1.00	0.98	1.00	0.97	1.00	0.97	1.00	0.95	1.00	0.95
Flt Protected	1.00	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Satd. Flow (prot)	1555	3098	1540	3012	2781	2896	1458	2772	1458	2772	1458	2772
Flt Permitted	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	1555	3098	1540	3012	2781	2896	1458	2772	1458	2772	1458	2772
Volume (vph)	140	771	20	40	849	145	363	290	60	100	325	180
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	149	820	21	43	903	154	386	309	64	106	346	170
RTOR Reduction (vph)	0	2	0	0	14	0	0	19	0	0	64	0
Lane Group Flow (vph)	149	839	0	43	1043	0	386	354	0	106	452	0
Heavy Vehicles (%)	1%	1%	1%	2%	2%	2%	2%	2%	2%	4%	4%	4%
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	1	6	5	2	3	8	7	4				
Permitted Phases												
Actuated Green, G (s)	11.5	39.5	5.2	33.2	14.8	26.6	8.7	20.5				
Effective Green, g (s)	13.5	41.5	7.2	35.2	16.8	28.6	10.7	22.5				
Actuated g/C Ratio	0.14	0.42	0.07	0.35	0.17	0.29	0.11	0.22				
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0				
Lane Grp Cap (vph)	210	1286	111	1080	467	828	156	624				
v/s Ratio Prot	c0.10	0.27	0.03	c0.35	c0.14	0.12	0.07	c0.16				
v/s Ratio Perm												
v/c Ratio	0.71	0.65	0.39	0.98	0.83	0.43	0.68	0.73				
Uniform Delay, d1	41.4	23.5	44.3	32.1	40.2	29.0	43.0	35.9				
Progression Factor	1.00	1.00	1.15	0.95	1.00	1.00	1.11	0.76				
Incremental Delay, d2	10.5	2.6	1.4	18.3	11.4	0.4	10.1	3.7				
Delay (s)	51.8	26.1	52.4	49.0	51.6	29.4	57.7	31.0				
Level of Service	D	C	D	D	D	C	E	C				
Approach Delay (s)	29.9			49.1		40.7		35.5				
Approach LOS	C			D		D		D				
Intersection Summary												
HCM Average Control Delay	39.4											
HCM Volume to Capacity ratio	0.85											
Actuated Cycle Length (s)	100.0											
Intersection Capacity Utilization	80.3%											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis 2010 With-Project Conditions - AM Peak Hour  
23: Yale St & Stewart St

500 Fifth Avenue North

Movement	SEL	SET	SER	NWL	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	1660	1411	1624	1710							
Flt Permitted	1.00	1.00	0.41	1.00							
Satd. Flow (perm)	1660	1411	706	1710							
Volume (vph)	0	209	45	30	10	0	0	0	0	570	1930
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	0	213	46	31	10	0	0	0	0	582	1969
RTOR Reduction (vph)	0	0	21	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	213	25	31	10	0	0	0	0	582	1969
Heavy Vehicles (%)	3%	3%	3%	0%	0%	0%	0%	0%	0%	4%	4%
Turn Type	3	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	3	3	3	3	3	3	3	3	3	3	3
Permitted Phases	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5
Actuated Green, G (s)	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0
Effective Green, g (s)	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22
Actuated g/C Ratio	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Clearance Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Vehicle Extension (s)	365	310	155	376							
Lane Grp Cap (vph)	c0.13	0.02	0.04	0.01							
v/s Ratio Prot	0.58	0.08	0.20	0.03							
v/s Ratio Perm	34.9	31.0	31.8	30.6							
Uniform Delay, d1	0.94	1.12	0.33	0.30							
Progression Factor	2.0	0.1	0.6	0.0							
Incremental Delay, d2	34.7	34.8	11.2	9.3							
Delay (s)	C	C	B	A							
Level of Service	C	C	B	A							
Approach Delay (s)	34.7			10.8							
Approach LOS	C			B							
Intersection Summary											
HCM Average Control Delay	5.3										
HCM Volume to Capacity ratio	0.60										
Actuated Cycle Length (s)	100.0										
Intersection Capacity Utilization	67.0%										
Analysis Period (min)	15										
c Critical Lane Group											

HCM Signalized Intersection Capacity Analysis 2010 With-Project Conditions - AM Peak Hour  
24: Yale St & Howell St

500 Fifth Avenue North

Movement	SEL	SET	SER	NWL	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	1593	1335									
Flt Permitted	0.95	1.00									
Satd. Flow (perm)	1593	1335									
Volume (vph)	15	729	25	0	0	0	35	190	430	0	360
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	17	848	29	0	0	0	41	221	500	0	419
RTOR Reduction (vph)	0	1	0	0	0	0	0	0	87	0	1
Lane Group Flow (vph)	17	876	0	0	0	0	262	413	0	424	0
Heavy Vehicles (%)	2%	2%	2%	0%	0%	0%	16%	16%	16%	1%	1%
Parking (#/hr)	20										
Turn Type	Split	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	2	2									
Permitted Phases	530	530									
Actuated Green, G (s)	55.0	55.0									
Effective Green, g (s)	0.55	0.55									
Actuated g/C Ratio	5.0	5.0									
Clearance Time (s)	3.0	3.0									
Vehicle Extension (s)	876	734									
Lane Grp Cap (vph)	0.01	c0.66									
v/s Ratio Prot	0.02	1.19									
v/s Ratio Perm	10.2	22.5									
Uniform Delay, d1	0.62	0.74									
Progression Factor	6.4	115.4									
Incremental Delay, d2	A	F									
Delay (s)	A	F									
Level of Service	A	F									
Approach Delay (s)	113.3										
Approach LOS	F										
Intersection Summary											
HCM Average Control Delay	88.0										
HCM Volume to Capacity ratio	1.05										
Actuated Cycle Length (s)	100.0										
Intersection Capacity Utilization	85.5%										
Analysis Period (min)	15										
c Critical Lane Group											

HCM Unsignalized Intersection Capacity Analysis 2010 With-Project Conditions - AM Peak Hour  
25: Harrison St & Site Access

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↑	↑↑	↑↑	↑↑	↑	↑
Sign Control	Free	Free	Free	Free	Stop	Stop
Grade	0%	0%	0%	0%	0%	0%
Volume (veh/h)	0	15	580	227	0	2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	16	630	247	0	2
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage (veh)						
Upstream signal (ft)		155				
pX, platoon unblocked						
vC, conflicting volume	877				770	334
vC1, stage 1 conf vol						
vC2, stage 2 conf vol	877				770	334
vCu, unblocked vol	4.1				6.8	6.9
tC, single (s)						
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	100
cM capacity (veh/h)	766				337	662
Direction, Lane #	EB 1	WB 1	WB 2	WB 3	SB 1	SB 1
Volume Total	16	252	252	373	2	2
Volume Left	0	0	0	0	0	0
Volume Right	0	0	0	247	2	2
cSH	1700	1700	1700	1700	662	662
Volume to Capacity	0.01	0.15	0.15	0.22	0.00	0.00
Queue Length 95th (ft)	0	0	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0	10.5	10.5
Lane LOS					B	B
Approach Delay (s)	0.0	0.0			10.5	
Approach LOS					B	
Intersection Summary						
Average Delay			0.0			
Intersection Capacity Utilization			26.3%			
Analysis Period (min)			15			
					ICU Level of Service	A

HCM Unsignalized Intersection Capacity Analysis 2010 With-Project Conditions - AM Peak Hour  
26: Mercer St & Site Driveway

Movement	EBT	EBR	WBT	WBR	NBT	NBR
Lane Configurations	↑↑↑	↑↑↑	↑↑↑	↑↑↑	↑	↑
Sign Control	Free	Free	Free	Free	Stop	Stop
Grade	0%	0%	0%	0%	0%	0%
Volume (veh/h)	1450	42	0	0	0	15
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	1611	47	0	0	0	17
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage (veh)						
Upstream signal (ft)	634				656	
pX, platoon unblocked						
vC, conflicting volume	1658				1634	426
vC1, stage 1 conf vol						
vC2, stage 2 conf vol	1658				1634	426
vCu, unblocked vol	4.1				6.8	6.9
tC, single (s)						
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	97
cM capacity (veh/h)	385				92	577
Direction, Lane #	EB 1	EB 2	EB 3	EB 4	NB 1	NB 1
Volume Total	460	460	460	277	17	17
Volume Left	0	0	0	0	0	0
Volume Right	0	0	0	47	17	17
cSH	1700	1700	1700	1700	577	577
Volume to Capacity	0.27	0.27	0.27	0.16	0.03	0.03
Queue Length 95th (ft)	0	0	0	0	0	2
Control Delay (s)	0.0	0.0	0.0	0.0	11.4	11.4
Lane LOS					B	B
Approach Delay (s)	0.0				11.4	
Approach LOS					B	
Intersection Summary						
Average Delay			0.1			
Intersection Capacity Utilization			31.7%			
Analysis Period (min)			15			
					ICU Level of Service	A

HCM Signalized Intersection Capacity Analysis 2010 With-Project Conditions - PM Peak Hour  
1: Roy St & 5th Ave

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4	4	4	4	4	4	4	4	4	4	4	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Flt	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Flt Protected	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Satd. Flow (prot)	1379	1379	1379	1379	1379	1379	1379	1379	1379	1379	1379	1379
Flt Permitted	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Satd. Flow (perm)	1379	1379	1379	1379	1379	1379	1379	1379	1379	1379	1379	1379
Volume (vph)	0	0	0	37	55	5	610	320	71	10	185	65
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	40	60	5	663	348	77	11	201	71
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	103	0	578	502	0	11	256	0
Conf. Peds. (#/hr)	0	0	0	20	20	20	20	20	20	20	20	20
Heavy Vehicles (%)	0%	0%	0%	2%	2%	2%	1%	1%	1%	6%	6%	6%
Parking (#/hr)	0	0	0	20	20	20	8	8	8	8	8	8
Turn Type	Protected Phases	Protected Phases	Protected Phases	Protected Phases	Protected Phases	Protected Phases	Protected Phases	Protected Phases	Protected Phases	Protected Phases	Protected Phases	Protected Phases
Permitted Phases	6	6	6	6	6	6	6	6	6	6	6	6
Actuated Green, G (s)	17.0	17.0	17.0	27.0	27.0	27.0	27.0	27.0	27.0	18.0	18.0	18.0
Effective Green, g (s)	20.0	20.0	20.0	30.0	30.0	30.0	30.0	30.0	30.0	21.0	21.0	21.0
Actuated g/C Ratio	0.25	0.25	0.25	0.38	0.38	0.38	0.38	0.38	0.38	0.26	0.26	0.26
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lane Grp Cap (vph)	345	345	345	615	533	432	372	372	372	432	372	372
v/s Ratio Prot	0.07	0.07	0.07	0.35	0.35	0.35	0.01	0.01	0.01	0.18	0.18	0.18
v/s Ratio Perm	0.30	0.30	0.30	0.94	0.94	0.94	0.03	0.03	0.03	0.69	0.69	0.69
Uniform Delay, d1	24.3	24.3	24.3	24.1	24.2	24.1	21.9	21.9	21.9	26.5	26.5	26.5
Progression Factor	1.00	1.00	1.00	0.20	0.19	0.20	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.2	2.2	2.2	12.7	14.4	12.7	0.1	0.1	0.1	9.9	9.9	9.9
Delay (s)	26.4	26.4	26.4	17.5	19.1	17.5	22.0	22.0	22.0	36.5	36.5	36.5
Level of Service	C	C	C	B	B	B	C	C	C	D	D	D
Approach Delay (s)	0.0	0.0	0.0	18.3	18.3	18.3	35.9	35.9	35.9	35.9	35.9	35.9
Approach LOS	A	A	A	B	B	B	D	D	D	D	D	D
Intersection Summary												
HCM Average Control Delay	22.2											
HCM Volume to Capacity ratio	0.69											
Actuated Cycle Length (s)	80.0											
Intersection Capacity Utilization	62.6%											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis 2010 With-Project Conditions - PM Peak Hour  
2: Broad St & 9th Ave

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4	4	4	4	4	4	4	4	4	4	4	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	10	10	11	12	12	12	9	8	12
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	0.95	0.95	1.00	0.95	1.00	0.91	0.91	0.91	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt	0.93	0.93	0.93	1.00	0.99	1.00	0.85	0.85	0.85	1.00	0.85	0.85
Flt Protected	1.00	1.00	1.00	0.95	1.00	0.99	1.00	1.00	1.00	0.99	1.00	1.00
Satd. Flow (prot)	2928	2928	2928	1507	2997	3847	1247	1247	1247	3847	1247	1247
Flt Permitted	1.00	1.00	1.00	0.27	1.00	0.99	1.00	1.00	1.00	0.99	1.00	1.00
Satd. Flow (perm)	2928	2928	2928	424	2997	3847	1247	1247	1247	3847	1247	1247
Volume (vph)	335	275	160	1574	135	140	945	208	5	0.97	0.97	0.97
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	345	284	165	1623	139	144	974	214	5	0	0	0
RTOR Reduction (vph)	121	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	508	0	165	1762	0	0	1118	218	0	0	0	0
Conf. Peds. (#/hr)	50	50	50	50	50	50	50	50	50	50	50	50
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	1%	1%	1%	1%	1%	1%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Turn Type	Protected Phases	Protected Phases	Protected Phases	Protected Phases	Protected Phases	Protected Phases	Protected Phases	Protected Phases	Protected Phases	Protected Phases	Protected Phases	Protected Phases
Permitted Phases	1	2	1	2	1	2	1	2	1	2	1	2
Actuated Green, G (s)	38.5	63.5	63.5	63.5	63.5	63.5	38.5	38.5	38.5	38.5	38.5	38.5
Effective Green, g (s)	41.5	66.5	66.5	66.5	66.5	66.5	41.5	41.5	41.5	41.5	41.5	41.5
Actuated g/C Ratio	0.35	0.58	0.58	0.60	0.60	0.60	0.35	0.35	0.35	0.35	0.35	0.35
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1013	498	1811	1330	431	431	1330	431	431	1330	431	431
v/s Ratio Prot	0.17	0.08	0.08	0.59	0.18	0.18	0.17	0.17	0.17	0.18	0.18	0.18
v/s Ratio Perm	0.50	0.33	0.33	0.97	0.84	0.84	0.51	0.51	0.51	0.51	0.51	0.51
Uniform Delay, d1	31.1	23.7	22.8	36.2	31.1	31.1	36.2	31.1	31.1	36.2	31.1	31.1
Progression Factor	1.00	0.27	0.29	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.8	0.1	0.1	7.0	5.0	5.0	7.0	5.0	5.0	7.0	5.0	5.0
Delay (s)	32.8	6.5	13.7	43.2	32.1	32.1	43.2	32.1	32.1	43.2	32.1	32.1
Level of Service	C	A	B	D	C	C	D	C	C	D	C	C
Approach Delay (s)	32.8	13.1	13.1	39.7	39.7	39.7	39.7	39.7	39.7	39.7	39.7	39.7
Approach LOS	C	B	B	D	D	D	D	D	D	D	D	D
Intersection Summary												
HCM Average Control Delay	25.4											
HCM Volume to Capacity ratio	0.92											
Actuated Cycle Length (s)	120.0											
Intersection Capacity Utilization	83.2%											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis 2010 With-Project Conditions - PM Peak Hour  
3: Broad St & Westlake Ave 500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations	4T	4T	4T	4T	4T	4T	4T	4T	4T	4T
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	12	12	10	12	10	12	12	12
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00	1.00
Fripb. ped/bikes	0.98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fipb. ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.98	1.00	1.00	0.85	1.00	0.94	1.00	1.00	1.00	1.00
Satd. Flow (prot)	2983	1624	3032	1454	1526	2819	1624	1710	1710	1710
Flt Permitted	0.81	0.43	1.00	1.00	0.45	1.00	0.10	1.00	1.00	1.00
Satd. Flow (perm)	2430	731	3032	1454	726	2819	175	1710	1710	1710
Volume (vph)	15	410	70	80	1749	1045	160	656	450	35
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	16	432	74	84	1841	1100	168	691	474	37
RTOR Reduction (vph)	0	11	0	0	0	24	0	103	0	0
Lane Group Flow (vph)	0	511	0	84	1841	1076	168	1062	0	37
Confli. Peds. (#/hr)	1	1	1	1	1	1	1	1	1	1
Heavy Vehicles (%)	1%	1%	1%	0%	0%	0%	1%	1%	1%	0%
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	2	2	2	2	2	2	2	2	2	2
Permitted Phases	2	2	2	2	2	2	2	2	2	2
Actuated Green, G (s)	72.5	72.5	72.5	72.5	72.5	72.5	36.5	36.5	36.5	36.5
Effective Green, g (s)	75.0	75.0	75.0	75.0	75.0	75.0	39.0	39.0	39.0	39.0
Actuated g/C Ratio	0.62	0.62	0.62	0.62	0.62	0.62	0.32	0.32	0.32	0.32
Clearance Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1519	457	1895	909	236	916	57	556	57	556
v/s Ratio Prot	0.21	0.11	0.11	0.07	0.23	0.38	0.21	0.21	0.21	0.14
v/s Ratio Perm	0.34	0.18	0.97	1.18	0.71	1.16	0.65	0.44	0.65	0.44
Uniform Delay, d1	10.7	9.5	21.5	22.5	35.6	40.5	34.6	32.0	34.6	32.0
Progression Factor	0.64	0.87	0.68	0.68	0.52	0.41	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1	0.1	11.4	90.8	1.7	73.2	45.4	2.6	45.4	2.6
Delay (s)	7.0	8.5	26.1	106.2	20.2	90.0	80.0	34.5	80.0	34.5
Level of Service	A	A	C	F	C	F	F	C	F	C
Approach Delay (s)	7.0	8.5	26.1	106.2	20.2	90.0	80.0	34.5	80.0	34.5
Approach LOS	A	A	D	D	F	F	F	D	F	D
Intersection Summary										
HCM Average Control Delay	56.0									
HCM Volume to Capacity ratio	1.18									
Actuated Cycle Length (s)	120.0									
Intersection Capacity Utilization	134.2%									
Analysis Period (min)	15									
c Critical Lane Group										

HCM Signalized Intersection Capacity Analysis 2010 With-Project Conditions - PM Peak Hour  
4: Valley St & Fairview Ave 500 Fifth Avenue North

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	4T	4T	4T	4T	4T	4T
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	10	12	12	12	12	12
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	1.00	1.00	1.00	0.95	1.00
Fripb. ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Fipb. ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3002	1151	812	3217	4536	1439
Flt Permitted	1.00	1.00	0.21	1.00	0.95	1.00
Satd. Flow (perm)	3002	1151	178	3217	4536	1439
Volume (vph)	722	50	5	912	1868	350
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	737	51	5	931	1906	357
RTOR Reduction (vph)	0	12	0	0	0	26
Lane Group Flow (vph)	737	39	5	931	1906	331
Heavy Vehicles (%)	1%	1%	100%	1%	1%	1%
Parking (#/hr)	20					
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	3	3	4	2	2
Permitted Phases	4	3	3	4	2	2
Actuated Green, G (s)	40.0	40.0	49.0	54.0	56.0	70.0
Effective Green, g (s)	42.0	42.0	53.0	56.0	58.0	72.0
Actuated g/C Ratio	0.35	0.35	0.44	0.47	0.48	0.60
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1051	403	137	1501	2192	863
v/s Ratio Prot	c0.25	0.00	c0.29	c0.42	0.23	
v/s Ratio Perm	0.70	0.10	0.04	0.62	0.87	0.38
Uniform Delay, d1	33.6	26.2	20.3	24.0	27.6	12.5
Progression Factor	1.25	1.43	1.00	1.00	1.00	1.01
Incremental Delay, d2	2.9	0.4	0.1	0.8	0.5	0.0
Delay (s)	45.1	37.9	20.4	24.8	28.3	12.6
Level of Service	D	D	C	C	C	B
Approach Delay (s)	44.6			24.8	25.8	
Approach LOS	D			C	C	
Intersection Summary						
HCM Average Control Delay	29.3					
HCM Volume to Capacity ratio	0.78					
Actuated Cycle Length (s)	120.0					
Intersection Capacity Utilization	74.2%					
Analysis Period (min)	15					
c Critical Lane Group						



HCM Signalized Intersection Capacity Analysis 2010 With-Project Conditions - PM Peak Hour  
5: Mercer St & 1st Avenue

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4↑						↑	↑				
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0					3.0	3.0				
Lane Width	0.95	0.95					1.00	0.95				
Lane Util. Factor	1.00	1.00					1.00	0.93				
Flt Protected	1.00	1.00					1.00	0.95				
Satd. Flow (prot)	3525	3525					1736	3241				
Flt Permitted	1.00	1.00					0.95	1.00				
Satd. Flow (perm)	3525	3525					1736	3241				
Volume (vph)	95	1093	0	0	0	0	150	410	325	0	0	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	100	1151	0	0	0	0	158	432	342	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	20	0	0	0	0
Lane Group Flow (vph)	0	1251	0	0	0	0	158	754	0	0	0	0
Heavy Vehicles (%)	2%	2%	2%	0%	0%	0%	4%	4%	4%	0%	0%	0%
Turn Type	Perm	Perm					Perm	Perm				
Protected Phases	1							2				
Permitted Phases	1							2				
Actuated Green, G (s)	36.0						36.0	36.0				
Effective Green, g (s)	37.0						37.0	37.0				
Actuated g/C Ratio	0.46						0.46	0.46				
Clearance Time (s)	4.0						4.0	4.0				
Lane Grp Cap (vph)	1630						803	1499				
v/s Ratio Prot								0.23				
v/s Ratio Perm	0.35						0.09					
v/c Ratio	0.27						0.20	0.50				
Uniform Delay, d1	17.9						12.7	15.1				
Progression Factor	1.00						1.00	1.00				
Incremental Delay, d2	3.5						0.5	1.2				
Delay (s)	21.4						13.3	16.3				
Level of Service	C						B	B				
Approach Delay (s)	21.4						0.0	15.8				
Approach LOS	C						A	B				
<b>Intersection Summary</b>												
HCM Average Control Delay	19.0								HCM Level of Service	B		
HCM Volume to Capacity ratio	0.64											
Actuated Cycle Length (s)	80.0								Sum of lost time (s)	6.0		
Intersection Capacity Utilization	61.4%								ICU Level of Service	B		
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis 2010 With-Project Conditions - PM Peak Hour  
6: Mercer St & 5th Ave

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4↑↑						↑	↑				
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0					3.0	3.0	3.0	3.0	3.0	
Lane Width	12	11	11	12	12	12	11	11	11	11	11	12
Lane Util. Factor	0.86	1.00					0.91	0.91	0.91	0.91	0.91	
Flt Protected	1.00	0.92					1.00	0.95	1.00	1.00	1.00	
Satd. Flow (prot)	1.00	1.00					1.00	1.00	1.00	1.00	1.00	
Flt Permitted	1.00	0.85					1.00	0.85	1.00	1.00	1.00	
Satd. Flow (perm)	5874	1421					3190	1335	1527	2843		
Volume (vph)	60	1232	166	0	0	0	991	394	115	152	0	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	
Adj. Flow (vph)	64	1311	177	0	0	0	1054	419	122	162	0	
RTOR Reduction (vph)	0	0	60	0	0	0	0	173	0	0	0	
Lane Group Flow (vph)	0	1375	117	0	0	0	1054	246	61	223	0	
Heavy Vehicles (%)	1%	1%	1%	0%	0%	0%	1%	1%	1%	4%	4%	
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	18	0	
Parking (#/hr)	25	25								8		
Turn Type	Perm	Perm	Perm				Perm	pm-pt				
Protected Phases	2						8					
Permitted Phases	2						8					
Actuated Green, G (s)	22.0	22.0					26.0	26.0	46.0	46.0		
Effective Green, g (s)	25.0	25.0					29.0	29.0	49.0	49.0		
Actuated g/C Ratio	0.31	0.31					0.36	0.36	0.61	0.61		
Clearance Time (s)	6.0	6.0					6.0	6.0	6.0	6.0		
Lane Grp Cap (vph)	1836	444					1156	484	405	1408		
v/s Ratio Prot							0.33		0.03	0.03		
v/s Ratio Perm	0.23	0.08					0.18	0.06	0.06			
v/c Ratio	0.75	0.26					0.91	0.51	0.15	0.16		
Uniform Delay, d1	24.7	20.6					24.3	19.9	19.0	6.7		
Progression Factor	0.74	0.47					0.78	0.59	2.57	2.81		
Incremental Delay, d2	2.1	1.0					11.4	3.5	0.7	0.2		
Delay (s)	20.2	10.7					30.4	15.2	49.5	18.9		
Level of Service	C	B					C	B	D	B		
Approach Delay (s)	19.1						0.0					
Approach LOS	B						A					
<b>Intersection Summary</b>												
HCM Average Control Delay	22.8								HCM Level of Service	C		
HCM Volume to Capacity ratio	0.85											
Actuated Cycle Length (s)	80.0								Sum of lost time (s)	6.0		
Intersection Capacity Utilization	74.8%								ICU Level of Service	D		
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis 2010 With-Project Conditions - PM Peak Hour  
7: Mercer St & Dexter Avenue  
500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBR	NBT	NBR	SBL	SBT	NEL	NER	NER2
Lane Configurations	4111										
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	10	11	10	12	12	12	12
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.86	1.00	0.95	1.00	0.95	1.00	1.00	0.95	1.00	0.95	0.95
Frt	1.00	0.86	1.00	0.85	1.00	0.85	1.00	1.00	0.87	0.85	0.85
Flt Protected	0.99	1.00	1.00	1.00	1.00	0.95	1.00	0.99	1.00	0.99	1.00
Satd. Flow (prot)	5761	1479	3032	1405	1501	3217	1478	1381			
Flt Permitted	0.99	1.00	1.00	1.00	1.00	0.18	1.00	0.99	1.00		
Satd. Flow (perm)	5761	1479	3032	1405	278	3217	1478	1381			
Volume (vph)	306	1714	50	100	460	155	285	440	25	315	10
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	344	1926	56	112	517	174	320	494	28	354	11
RTOR Reduction (vph)	0	0	0	58	0	11	0	0	0	2	0
Lane Group Flow (vph)	0	2326	0	54	517	163	320	494	210	181	0
Heavy Vehicles (%)	1%	1%	1%	0%	0%	0%	1%	1%	0%	0%	0%
Turn Type	Perm	Perm	custom	Perm	pm+pt	Perm	pm+pt	Perm	Prot	Prot	Prot
Protected Phases	1	1	4	1	4	3	7	2	2	2	2
Permitted Phases	1	1	4	1	4	7	7	7	7	7	7
Actuated Green, G (s)	64.0	64.0	26.0	26.0	44.0	44.0	44.0	14.0	14.0	14.0	14.0
Effective Green, g (s)	67.0	67.0	29.0	29.0	47.0	47.0	47.0	17.0	17.0	17.0	17.0
Actuated g/C Ratio	0.48	0.48	0.21	0.21	0.34	0.34	0.34	0.12	0.12	0.12	0.12
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lane Grp Cap (vph)	2757	708	628	291	224	1080	179	168			
v/s Ratio Prot	0.04	0.17	0.12	c0.15	0.15	c0.14	0.13				
v/s Ratio Perm	0.40	0.82	0.56	1.43	0.46	1.17	1.08				
v/c Ratio	0.84	1.97	53.1	49.8	39.9	36.5	61.5	61.5			
Uniform Delay, d1	31.9	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Incremental Delay, d2	3.4	0.2	11.6	7.6	216.7	1.4	121.6	92.0			
Delay (s)	35.3	20.0	64.7	57.4	256.6	37.9	183.1	153.5			
Level of Service	D	B	E	E	F	D	F	F	F	F	F
Approach Delay (s)	35.3	62.8			123.9	169.3					
Approach LOS	D	E			F	F					
Intersection Summary											
HCM Average Control Delay	68.1						HCM Level of Service				
HCM Volume to Capacity ratio	1.09						E				
Actuated Cycle Length (s)	140.0						Sum of lost time (s)				
Intersection Capacity Utilization	93.6%						ICU Level of Service				
Analysis Period (min)	15						F				
Critical Lane Group											

HCM Signalized Intersection Capacity Analysis 2010 With-Project Conditions - PM Peak Hour  
8: Mercer St & 9th Ave  
500 Fifth Avenue North

Movement	EBT	EBR	SBL	SBT	SBR	SER
Lane Configurations	1111		4	4		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	9	12	11
Total Lost time (s)	3.0		3.0	3.0		
Lane Util. Factor	0.86		0.91	0.91		
Frb, ped/bikes	1.00		1.00	1.00		
Fipb, ped/bikes	1.00		0.88	0.94		
Flt	1.00		1.00	0.98		
Flt Protected	1.00		0.95	0.98		
Satd. Flow (prot)	5617		1288	2495		
Flt Permitted	1.00		0.95	0.98		
Satd. Flow (perm)	5617		1288	2495		
Volume (vph)	2169	35	705	285	80	0
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	2213	36	719	291	82	0
RTOR Reduction (vph)	2	0	3	3	0	0
Lane Group Flow (vph)	2247	0	357	729	0	0
Confl. Peds. (#/hr)			50			
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%
Bus Blockages (#/hr)	0	0	0	2	0	0
Turn Type	Perm	Perm	21	21	custom	custom
Protected Phases	1					21
Permitted Phases			2			
Actuated Green, G (s)	69.9		39.1	39.1		
Effective Green, g (s)	72.4		41.6	41.6		
Actuated g/C Ratio	0.60		0.35	0.35		
Clearance Time (s)	5.5		5.5	5.5		
Vehicle Extension (s)	3.0		3.0	3.0		
Lane Grp Cap (vph)	3389		447	865		
v/s Ratio Prot	c0.40					
v/s Ratio Perm			0.28	0.29		
v/c Ratio	0.66		0.80	0.84		
Uniform Delay, d1	15.7		35.4	36.2		
Progression Factor	1.00		1.44	1.44		
Incremental Delay, d2	1.0		6.6	5.2		
Delay (s)	16.8		57.6	57.3		
Level of Service	B		E	E		
Approach Delay (s)	16.8			57.4		
Approach LOS	B			E		
Intersection Summary						
HCM Average Control Delay	30.1			HCM Level of Service		
HCM Volume to Capacity ratio	0.73			C		
Actuated Cycle Length (s)	120.0			Sum of lost time (s)		
Intersection Capacity Utilization	65.2%			ICU Level of Service		
Analysis Period (min)	15			C		
Phase conflict between lane groups.						
Critical Lane Group						

HCM Signalized Intersection Capacity Analysis 2010 With-Project Conditions - PM Peak Hour  
9: Mercer St & Westlake Ave 500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4↑↑↑											
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	12	12	12	12	12	11	12	12	12	12
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.86	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	1.00	1.00	1.00
Fit	1.00	0.99	0.85	1.00	1.00	1.00	1.00	0.99	0.85	1.00	1.00	1.00
Fit Protected	1.00	1.00	1.00	0.95	1.00	1.00	1.00	0.95	1.00	0.95	1.00	1.00
Satd. Flow (prot)	5605	2952	1310	1624	1710							
Fit Permitted	1.00	1.00	1.00	0.95	1.00	1.00	1.00	0.95	1.00	1.00	1.00	1.00
Satd. Flow (perm)	5605	2952	1310	1624	1710							
Volume (vph)	231	2623	10	0	0	0	0	1070	605	230	95	0
Peak-hour factor; PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	233	2649	10	0	0	0	0	1081	611	232	96	0
RTOR Reduction (vph)	0	1	0	0	0	0	0	3	34	0	0	0
Lane Group Flow (vph)	0	2891	0	0	0	0	0	1146	509	232	96	0
Heavy Vehicles (%)	1%	1%	1%	0%	0%	0%	0%	1%	1%	0%	0%	0%
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	4	4	4	4	4	6	5	2	2	2
Permitted Phases	4	4	4	4	4	4	4	6	6	6	6	6
Actuated Green, G (s)	48.5	37.0	37.0	18.0	60.5							
Effective Green, g (s)	51.0	39.5	39.5	20.5	63.0							
Actuated g/C Ratio	0.42	0.33	0.33	0.17	0.52							
Clearance Time (s)	5.5	5.5	5.5	5.5	5.5							
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0							
Lane Grp Cap (vph)	2382	972	431	277	898							
v/s Ratio Prot	0.52	0.39	c0.39		0.06							
v/s Ratio Perm	1.21	1.18	1.18	0.84	0.11							
Uniform Delay, d1	34.5	40.2	40.2	48.1	14.3							
Progression Factor	0.81	1.00	0.99	1.27	0.76							
Incremental Delay, d2	99.1	90.9	102.9	23.9	0.2							
Delay (s)	127.1	131.0	142.9	84.9	11.1							
Level of Service	F	F	F	F	B							
Approach Delay (s)	127.1	134.8	134.8	84.9	63.3							
Approach LOS	F	F	F	A	E							
Intersection Summary												
HCM Average Control Delay	125.5	HCM Level of Service					F					
HCM Volume to Capacity ratio	1.13											
Actuated Cycle Length (s)	120.0	Sum of lost time (s)					9.0					
Intersection Capacity Utilization	110.5%	ICU Level of Service					H					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis 2010 With-Project Conditions - PM Peak Hour  
10: Mercer St & Fairview Ave 500 Fifth Avenue North

Movement	EBL	EBT	EBR	EBR2	WBL	WBR	NBT	NBR	NBR2	SBT
Lane Configurations	4↑↑	↑	↑	↑	↑↑	↑↑	↑	↑	↑	↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	12	12	12	12	10	12	12	12
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.91	1.00	0.97	0.88	1.00	0.88	1.00	0.88	1.00	1.00
Fit	1.00	0.85	1.00	0.85	1.00	0.85	1.00	0.85	1.00	1.00
Fit Protected	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	4512	1454	3120	2533	1596	2558	1613			1613
Fit Permitted	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (perm)	4512	1454	3120	2533	1596	2558	1613			1613
Volume (vph)	5	3428	330	70	425	2002	300	1310	10	65
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	5	3534	340	72	438	2064	309	1351	10	67
RTOR Reduction (vph)	0	0	6	0	0	63	0	1	0	0
Lane Group Flow (vph)	0	3539	406	0	438	2001	309	1360	0	67
Heavy Vehicles (%)	0%	0%	0%	0%	1%	1%	0%	0%	0%	6%
Turn Type	Split	Prot	Prot	Prot	Custom	Custom	pt+ov	pt+ov		
Protected Phases	1	1	1	2	12	3	23	3		
Permitted Phases	12			12						
Actuated Green, G (s)	69.5	69.5	12.5	87.5	17.5	35.5	17.5	35.5		17.5
Effective Green, g (s)	72.0	72.0	15.0	90.0	24.0	42.0	24.0	42.0		24.0
Actuated g/C Ratio	0.60	0.60	0.12	0.75	0.20	0.35	0.20	0.35		0.20
Clearance Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	9.5	9.5		9.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0
Lane Grp Cap (vph)	2707	872	390	1900	319	895	323			
v/s Ratio Prot	c0.78	0.28	0.14	0.79	0.19	c0.53	0.04			
v/s Ratio Perm										
v/c Ratio	1.31	0.47	1.12	1.05	0.97	1.52	0.21			
Uniform Delay, d1	24.0	13.3	52.5	15.0	47.6	39.0	40.1			
Progression Factor	0.43	0.40	1.00	1.00	1.00	1.00	0.68			
Incremental Delay, d2	138.6	0.2	83.4	36.3	41.4	239.7	0.3			
Delay (s)	149.0	5.5	135.9	51.3	89.1	278.7	27.7			
Level of Service	F	A	F	D	F	F	C			
Approach Delay (s)	134.0				243.6		27.7			
Approach LOS	F				F		C			
Intersection Summary										
HCM Average Control Delay	134.8	HCM Level of Service					F			
HCM Volume to Capacity ratio	1.39									
Actuated Cycle Length (s)	120.0	Sum of lost time (s)					6.0			
Intersection Capacity Utilization	179.1%	ICU Level of Service					H			
Analysis Period (min)	15									
! Phase conflict between lane groups.										
c Critical Lane Group										



HCM Signalized Intersection Capacity Analysis 2010 With-Project Conditions - PM Peak Hour  
11: Republican St & 5th Ave

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	12	12	12	12	12	12	12	12	12	12	12	12
Lane Width	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Total Lost time (s)	0.95	0.95	1.00	0.91	1.00	0.91	1.00	0.95	1.00	0.95	1.00	0.95
Lane Util. Factor	1.00	0.98	1.00	1.00	1.00	1.00	1.00	1.00	0.99	1.00	0.99	1.00
Flpb, ped/bikes	0.98	1.00	0.86	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	0.85	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1624	1448	1470	4893	1672	3314						
Flt Permitted	0.95	1.00	0.54	1.00	0.15	1.00						
Satd. Flow (perm)	1624	1448	835	4893	259	3314						
Volume (vph)	0	0	0	214	5	104	20	1291	31	13	315	10
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	0	0	0	230	5	112	22	1388	33	14	339	11
RTOR Reduction (vph)	0	0	0	0	0	16	0	2	0	0	2	0
Lane Group Flow (vph)	0	0	0	235	96	22	1419	0	14	348	0	0
Conf. Peds. (#/hr)	10	20	20	75	20	20	75	20	20	75	20	75
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	2%	2%	2%	4%	4%
Parking (#/hr)	8											
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	2	2	2	2	2	2	2	2	2	2	2	2
Permitted Phases	2	2	2	2	2	2	2	2	2	2	2	2
Actuated Green, G (s)	20.4	20.4	48.6	48.6	48.6	48.6	48.6	48.6	48.6	48.6	48.6	48.6
Effective Green, g (s)	22.4	22.4	51.6	51.6	51.6	51.6	51.6	51.6	51.6	51.6	51.6	51.6
Actuated g/C Ratio	0.28	0.28	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64
Clearance Time (s)	5.0	5.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	455	405	539	3156	167	2138						
v/s Ratio Prot	0.14	0.07	0.03	c0.29		0.10						
v/c Ratio Perm	0.52	0.24	0.04	0.45	0.05	0.08	0.16					
Uniform Delay, d1	24.2	22.2	5.2	7.1	5.3	5.6	5.6					
Progression Factor	1.00	1.00	0.98	0.60	0.55	0.59	0.59					
Incremental Delay, d2	1.0	0.3	0.1	0.4	1.0	0.2	0.2					
Delay (s)	25.2	22.5	5.2	4.7	3.9	3.5	3.5					
Level of Service	C	C	A	A	A	A	A					
Approach Delay (s)	0.0		24.4	4.7		3.5						
Approach LOS	A		C	A		A						
Intersection Summary												
HCM Average Control Delay	7.6											
HCM Volume to Capacity ratio	0.47											
Actuated Cycle Length (s)	80.0											
Intersection Capacity Utilization	53.4%											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis 2010 With-Project Conditions - PM Peak Hour  
12: Harrison St & 5th Ave

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	12	12	12	12	12	12	12	12	12	12	12	12
Lane Width	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Total Lost time (s)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Util. Factor	1.00	0.91	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	0.94	1.00	0.93	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	0.85	1.00	1.00	0.85	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.95	1.00	0.97	1.00	0.97	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1517	1232	1674	2748	1558	3333						
Flt Permitted	0.73	1.00	0.87	1.00	0.40	1.00						
Satd. Flow (perm)	1169	1232	1503	2748	653	3333						
Volume (vph)	15	0	25	25	10	742	25	585	15	5	504	10
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	16	0	27	27	11	815	27	643	16	5	554	11
RTOR Reduction (vph)	0	17	0	0	0	0	0	2	0	0	1	0
Lane Group Flow (vph)	16	10	0	0	38	815	27	657	0	0	569	0
Conf. Peds. (#/hr)	10	20	20	75	20	75	20	75	20	75	20	75
Heavy Vehicles (%)	19%	19%	19%	0%	0%	0%	0%	4%	4%	4%	4%	4%
Parking (#/hr)	8											
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	2	2	2	2	2	2	2	2	2	2	2	2
Permitted Phases	2	2	2	2	2	2	2	2	2	2	2	2
Actuated Green, G (s)	28.3	28.3	28.3	28.3	28.3	41.7	41.7	41.7	41.7	41.7	41.7	41.7
Effective Green, g (s)	29.3	29.3	29.3	29.3	29.3	44.7	44.7	44.7	44.7	44.7	44.7	44.7
Actuated g/C Ratio	0.37	0.37	0.37	0.37	0.37	0.56	0.56	0.56	0.56	0.56	0.56	0.56
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	428	451	550	1006	365	1862						
v/s Ratio Prot	0.01			c0.30		c0.20						
v/c Ratio Perm	0.04	0.02	0.07	0.81	0.07	0.35	0.32					
Uniform Delay, d1	16.3	16.2	16.5	22.8	8.1	9.7	9.5					
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.57	1.55					
Incremental Delay, d2	0.0	0.0	0.1	5.0	0.2	0.3	0.5					
Delay (s)	16.3	16.2	16.5	27.9	13.0	15.3	10.2					
Level of Service	B	B	B	C	B	B	B					
Approach Delay (s)	16.3		27.4			15.2						
Approach LOS	B		C			B						
Intersection Summary												
HCM Average Control Delay	18.7											
HCM Volume to Capacity ratio	0.53											
Actuated Cycle Length (s)	80.0											
Intersection Capacity Utilization	65.9%											
Analysis Period (min)	15											
c Critical Lane Group												



HCM Signalized Intersection Capacity Analysis 2010 With-Project Conditions - PM Peak Hour  
15: Denny Way & 1st Avenue  
500 Fifth Avenue North

[illegible]

HCM Signalized Intersection Capacity Analysis 2010 With-Project Conditions - PM Peak Hour  
16: Denny Way & Broad St  
500 Fifth Avenue North

Movement	EBL		EBT		EBR		WBL		WBT		WBR		NEL		NER		NWL		NSL		SWT		SWR	
	1900		1900		1900		1900		1900		1900		1900		1900		1900		1900		1900		1900	
	12	11	12	11	12	11	12	11	12	11	12	11	12	10	12	10	12	10	12	10	9	10	9	
Lane Configurations																								
Ideal Flow (vphpt)																								
Lane Width																								
Total Lost time (s)																								
Lane Util. Factor																								
Frbp, ped/bikes																								
Fipb, ped/bikes																								
Frt																								
Frt Protected																								
Satd. Flow (prot)																								
Flt Permitted																								
Satd. Flow (perm)																								
Volume (vph)																								
Peak-hour factor, PHF																								
Adj. Flow (vph)																								
RTOR Reduction (vph)																								
Lane Group Flow (vph)																								
Conf. Peds. (#/hr)																								
Heavy Vehicles (%)																								
Bus Blockages (#/hr)																								
Turn Type																								
Protected Phases																								
Permitted Phases																								
Actuated Green, G (s)																								
Effective Green, g (s)																								
Actuated g/C Ratio																								
Clearance Time (s)																								
Lane Grp Cap (vph)																								
v/s Ratio Prot																								
v/s Ratio Perm																								
Uniform Delay, d1																								
Progression Factor																								
Incremental Delay, d2																								
Delay (s)																								
Level of Service																								
Approach Delay (s)																								
Approach LOS																								
Intersection Summary																								
HCM Average Control Delay																								
HCM Volume to Capacity ratio																								
Actuated Cycle Length (s)																								
Intersection Capacity Utilization																								
Analysis Period (min)																								
Critical Lane Group																								

HCM Signalized Intersection Capacity Analysis 2010 With-Project Conditions - PM Peak Hour  
17: Denny Way & 5th Ave

Movement	EBT	EBR	EBR2	WBT	WBR	NBL	NBT	NBR	NBR2	SBL2	SBL	SBT
Lane Configurations	←↑	←↑	←↑	←↑	←↑	←↑	←↑	←↑	←↑	←↑	←↑	←↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	10	12	12	10	12	12	11	12	13
Total Lost time (s)	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0
Lane Util. Factor	0.95		0.95	0.95		0.95	0.95		0.95	1.00	1.00	1.00
Frpb, ped/bikes	0.99		0.99	0.99		1.00	1.00		1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00
Flt	0.97		0.98	0.98		0.97	0.97		0.97	1.00	0.99	0.99
Flt Protected	1.00		1.00	1.00		1.00	1.00		1.00	0.95	1.00	1.00
Satd. Flow (prot)	3272		3205	3205		2957	2957		1752	1875	1752	1875
Flt Permitted	1.00		1.00	1.00		1.00	1.00		0.95	1.00	0.95	1.00
Satd. Flow (perm)	3272		3205	3205		2957	2957		1752	1875	1752	1875
Volume (vph)	745	175	15	795	156	5	150	35	10	110	205	110
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	793	186	16	846	166	5	160	37	11	117	218	117
RTOR Reduction (vph)	1	0	0	15	0	0	4	0	0	0	4	0
Lane Group Flow (vph)	994	0	0	997	0	0	209	0	0	0	335	124
Confl. Peds. (#/hr)		8		23	17							
Heavy Vehicles (%)	2%	2%	2%	1%	1%	6%	6%	6%	6%	3%	3%	3%
Bus Blockages. (#/hr)	3	0	0	4	0	0	18	0	0	0	0	0
Turn Type	1	1	1	3	3	3	3	3	2	2	2	2
Protected Phases	1	1	1	3	3	3	3	3	2	2	2	2
Permitted Phases	1	1	1	3	3	3	3	3	2	2	2	2
Actuated Green, G (s)	50.7		50.7	12.0		12.0	12.0		22.3	22.3	22.3	22.3
Effective Green, g (s)	52.7		52.7	14.0		14.0	14.0		24.3	24.3	24.3	24.3
Actuated g/C Ratio	0.53		0.53	0.14		0.14	0.14		0.24	0.24	0.24	0.24
Clearance Time (s)	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1724		1689	414		414	414		426	456	426	456
v/s Ratio Prot	0.30		0.31	0.07		0.07	0.07		0.19	0.07	0.19	0.07
v/s Ratio Perm	0.58		0.59	0.50		0.50	0.50		0.79	0.27	0.79	0.27
Uniform Delay, d1	16.1		16.2	39.8		39.8	39.8		35.4	30.7	35.4	30.7
Progression Factor	0.22		0.73	1.00		1.00	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	1.0		1.4	1.0		1.0	1.0		9.3	0.3	9.3	0.3
Delay (s)	4.6		13.4	40.8		40.8	40.8		44.7	31.0	44.7	31.0
Level of Service	A		B	D		D	D		D	D	D	C
Approach Delay (s)	4.6		13.4	40.8		40.8	40.8		40.9	40.9	40.9	40.9
Approach LOS	A		B	D		D	D		D	D	D	D
Intersection Summary												
HCM Average Control Delay	17.1	HCM Level of Service B										
HCM Volume to Capacity Ratio	0.63											
Actuated Cycle Length (s)	100.0	Sum of lost time (s) 9.0										
Intersection Capacity Utilization	60.6%	ICU Level of Service B										
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis 2010 With-Project Conditions - PM Peak Hour  
17: Denny Way & 5th Ave

Movement	SBR
Lane Configurations	←
Ideal Flow (vphpl)	1900
Lane Width	12
Total Lost time (s)	
Lane Util. Factor	
Frpb, ped/bikes	
Flpb, ped/bikes	
Flt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Volume (vph)	10
Peak-hour factor, PHF	0.94
Adj. Flow (vph)	11
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Confl. Peds. (#/hr)	17
Heavy Vehicles (%)	3%
Bus Blockages (#/hr)	0
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	
Intersection Summary	

HCM Signalized Intersection Capacity Analysis - PM Peak Hour  
18: Denny Way & Aurora Ave  
500 Fifth Avenue North

Movement	EBT	EBR	EBR2	WBT	WBR	NBT	NBR	NBR2	SBL2	SBL	SBT	SBR
Lane Configurations	11	12	11	12	11	12	12	12	12	12	12	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	11	12	11	12	12	12	12	12	12	12
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	1.00	0.95	0.95	0.95	0.95	0.95
Fit Protected	0.99	0.99	0.97	0.98	0.98	0.98	0.85	0.85	0.85	0.85	0.85	0.85
Fit Permitted	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	3085	3085	3016	3016	3155	3155	1593	1332	1394	1394	1394	1394
Satd. Flow (perm)	3085	3085	3016	3016	3155	3155	1593	1332	1394	1394	1394	1394
Volume (vph)	1077	55	5	1129	285	1020	145	5	220	70	0	450
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	1099	56	5	1152	291	1041	148	5	224	71	0	459
RTOR Reduction (vph)	0	0	0	22	0	0	0	0	0	0	0	3
Lane Group Flow (vph)	1180	0	0	1421	0	1194	0	0	0	295	239	237
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	4	0
Turn Type	Protected Phases	2	2	4	4	4	4	4	4	4	4	4
Permitted Phases	Permitted Phases	2	2	4	4	4	4	4	4	4	4	4
Actuated Green, G (s)	26.0	26.0	26.0	32.4	32.4	32.4	22.6	60.0	60.0	60.0	60.0	60.0
Effective Green, g (s)	32.0	32.0	32.0	34.4	34.4	34.4	24.6	62.0	62.0	62.0	62.0	62.0
Actuated g/C Ratio	0.32	0.32	0.32	0.34	0.34	0.34	0.25	0.62	0.62	0.62	0.62	0.62
Clearance Time (s)	9.0	9.0	9.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	987	965	965	1085	1085	1085	392	826	839	839	839	839
v/s Ratio Prot	0.38	c0.47	c0.47	c0.38	c0.38	c0.38	c0.19	0.18	0.18	0.18	0.18	0.18
v/s Ratio Perm	1.18	1.47	1.47	1.10	1.10	1.10	0.75	0.29	0.28	0.28	0.28	0.28
Uniform Delay, d1	34.0	34.0	34.0	32.8	32.8	32.8	34.9	8.8	8.8	8.8	8.8	8.8
Progression Factor	0.98	0.53	0.53	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	88.8	216.5	216.5	59.1	59.1	59.1	8.0	0.2	0.2	0.2	0.2	0.2
Delay (s)	122.2	234.5	234.5	91.9	91.9	91.9	42.8	9.0	8.9	8.9	8.9	8.9
Level of Service	F	F	F	F	F	F	D	A	A	A	A	A
Approach Delay (s)	122.2	234.5	234.5	91.9	91.9	91.9	21.9	21.9	21.9	21.9	21.9	21.9
Approach LOS	F	F	F	F	F	F	C	C	C	C	C	C
Intersection Summary												
HCM Average Control Delay	132.8	132.8	132.8	132.8	132.8	132.8	132.8	132.8	132.8	132.8	132.8	132.8
HCM Volume to Capacity ratio	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14
Actuated Cycle Length (s)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Intersection Capacity Utilization	109.3%	109.3%	109.3%	109.3%	109.3%	109.3%	109.3%	109.3%	109.3%	109.3%	109.3%	109.3%
Analysis Period (min)	15	15	15	15	15	15	15	15	15	15	15	15
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis - PM Peak Hour  
18: Denny Way & Aurora Ave  
500 Fifth Avenue North

Movement	EBT	EBR	EBR2	WBT	WBR	NBT	NBR	NBR2	SBL2	SBL	SBT	SBR
Lane Configurations	11	12	11	12	11	12	12	12	12	12	12	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	11	12	11	12	12	12	12	12	12	12
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	1.00	0.95	0.95	0.95	0.95	0.95
Fit Protected	0.99	0.99	0.97	0.98	0.98	0.98	0.85	0.85	0.85	0.85	0.85	0.85
Fit Permitted	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	3085	3085	3016	3016	3155	3155	1593	1332	1394	1394	1394	1394
Satd. Flow (perm)	3085	3085	3016	3016	3155	3155	1593	1332	1394	1394	1394	1394
Volume (vph)	1077	55	5	1129	285	1020	145	5	220	70	0	450
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	1099	56	5	1152	291	1041	148	5	224	71	0	459
RTOR Reduction (vph)	0	0	0	22	0	0	0	0	0	0	0	3
Lane Group Flow (vph)	1180	0	0	1421	0	1194	0	0	0	295	239	237
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	4	0
Turn Type	Protected Phases	2	2	4	4	4	4	4	4	4	4	4
Permitted Phases	Permitted Phases	2	2	4	4	4	4	4	4	4	4	4
Actuated Green, G (s)	26.0	26.0	26.0	32.4	32.4	32.4	22.6	60.0	60.0	60.0	60.0	60.0
Effective Green, g (s)	32.0	32.0	32.0	34.4	34.4	34.4	24.6	62.0	62.0	62.0	62.0	62.0
Actuated g/C Ratio	0.32	0.32	0.32	0.34	0.34	0.34	0.25	0.62	0.62	0.62	0.62	0.62
Clearance Time (s)	9.0	9.0	9.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	987	965	965	1085	1085	1085	392	826	839	839	839	839
v/s Ratio Prot	0.38	c0.47	c0.47	c0.38	c0.38	c0.38	c0.19	0.18	0.18	0.18	0.18	0.18
v/s Ratio Perm	1.18	1.47	1.47	1.10	1.10	1.10	0.75	0.29	0.28	0.28	0.28	0.28
Uniform Delay, d1	34.0	34.0	34.0	32.8	32.8	32.8	34.9	8.8	8.8	8.8	8.8	8.8
Progression Factor	0.98	0.53	0.53	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	88.8	216.5	216.5	59.1	59.1	59.1	8.0	0.2	0.2	0.2	0.2	0.2
Delay (s)	122.2	234.5	234.5	91.9	91.9	91.9	42.8	9.0	8.9	8.9	8.9	8.9
Level of Service	F	F	F	F	F	F	D	A	A	A	A	A
Approach Delay (s)	122.2	234.5	234.5	91.9	91.9	91.9	21.9	21.9	21.9	21.9	21.9	21.9
Approach LOS	F	F	F	F	F	F	C	C	C	C	C	C
Intersection Summary												
HCM Average Control Delay	132.8	132.8	132.8	132.8	132.8	132.8	132.8	132.8	132.8	132.8	132.8	132.8
HCM Volume to Capacity ratio	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14
Actuated Cycle Length (s)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Intersection Capacity Utilization	109.3%	109.3%	109.3%	109.3%	109.3%	109.3%	109.3%	109.3%	109.3%	109.3%	109.3%	109.3%
Analysis Period (min)	15	15	15	15	15	15	15	15	15	15	15	15
c Critical Lane Group												



HCM Signalized Intersection Capacity Analysis 2010 With-Project Conditions - PM Peak Hour  
19: Denny Way & Dexter Avenue  
500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4T			4T			4T			4T		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Fit	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	1.00
Fit Protected	0.99	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3197			3210			1464	2887		1593	3185	1425
Fit Permitted	0.96			1.00			0.47	1.00		0.53	1.00	1.00
Satd. Flow (perm)	1815			3210			724	2887		891	3185	1425
Volume (vph)	140	1207	10	0	1141	100	10	195	20	105	260	223
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	149	1284	11	0	1214	106	11	207	21	112	277	237
RTOR Reduction (vph)	0	0	0	0	4	0	0	10	0	0	0	188
Lane Group Flow (vph)	0	1444	0	0	1316	0	11	218	0	112	277	49
Heavy Vehicles (%)	1%	1%	1%	0%	0%	0%	11%	11%	11%	2%	2%	2%
Turn Type	pm+pt						Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	2	5				1		3			3	
Permitted Phases	5					3		3			3	
Actuated Green, G (s)	70.2			52.2		17.8	17.8	17.8		17.8	17.8	17.8
Effective Green, g (s)	73.2			55.2		20.8	20.8	20.8		20.8	20.8	20.8
Actuated g/C Ratio	0.73			0.55		0.21	0.21	0.21		0.21	0.21	0.21
Clearance Time (s)	6.0			6.0		6.0	6.0	6.0		6.0	6.0	6.0
Vehicle Extension (s)	3.0			3.0		3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	1536			1772		151	600	185		662	296	
v/s Ratio Prot	c0.14			0.41								
v/s Ratio Perm	c0.55			0.02		0.02	0.08			c0.13	0.09	
v/c Ratio	0.94			0.74		0.07	0.36			0.61	0.42	0.17
Uniform Delay, d1	11.5			17.0		31.8	33.9			35.9	34.4	32.5
Progression Factor	0.90			0.56		1.00	1.00			1.00	1.00	1.00
Incremental Delay, d2	1.4			2.6		0.2	0.4			5.5	0.4	0.3
Delay (s)	11.7			12.1		32.1	34.3			41.4	34.8	32.8
Level of Service	B			B		C	C			D	C	C
Approach Delay (s)	11.7			12.1			34.2				35.2	
Approach LOS	B			B			C				D	
Intersection Summary												
HCM Average Control Delay				17.4								
HCM Volume to Capacity ratio				0.85								
Actuated Cycle Length (s)				100.0								
Intersection Capacity Utilization				107.0%								
Analysis Period (min)				15								
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis 2010 With-Project Conditions - PM Peak Hour  
20: Denny Way & Westlake Ave  
500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4T			4T			4T			4T		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.99	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Fit	1.00	0.99	1.00	0.97	0.96	0.96	1.00	0.96	1.00	0.96	1.00	0.96
Fit Protected	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3090			3022			2994			1624	3111	
Fit Permitted	1.00			1.00			1.00			0.15	1.00	
Satd. Flow (perm)	3090			3022			2994			263	3111	
Volume (vph)	0	1392	60	0	1096	255	0	610	200	85	115	45
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	0	1481	64	0	1166	271	0	649	213	90	122	48
RTOR Reduction (vph)	0	3	0	0	19	0	0	18	0	0	31	0
Lane Group Flow (vph)	0	1542	0	0	1418	0	0	844	0	90	139	0
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%	0%	0%	0%
Turn Type												
Protected Phases	1			1			2				2	
Permitted Phases												
Actuated Green, G (s)	56.7			56.7			33.3				33.3	
Effective Green, g (s)	58.7			58.7			35.3				35.3	
Actuated g/C Ratio	0.59			0.59			0.35				0.35	
Clearance Time (s)	5.0			5.0			5.0				5.0	
Vehicle Extension (s)	3.0			3.0			3.0				3.0	
Lane Grp Cap (vph)	1814			1774			1057			93	1098	
v/s Ratio Prot	c0.50			0.47			0.28				0.04	
v/s Ratio Perm										c0.34		
v/c Ratio	0.85			0.80			0.80			0.97	0.13	
Uniform Delay, d1	17.0			16.1			29.1			31.8	21.9	
Progression Factor	0.61			1.00			1.00			1.00	1.00	
Incremental Delay, d2	4.8			3.9			4.3			81.9	0.1	
Delay (s)	15.2			20.0			33.4			113.7	22.0	
Level of Service	B			B			C			F	C	
Approach Delay (s)	15.2			20.0			33.4				53.7	
Approach LOS	B			B			C				D	
Intersection Summary												
HCM Average Control Delay				23.1								
HCM Volume to Capacity ratio				0.89								
Actuated Cycle Length (s)				100.0								
Intersection Capacity Utilization				86.5%								
Analysis Period (min)				15								
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis 2010 With-Project Conditions - PM Peak Hour  
21: Denny Way & Fairview Ave  
500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SSR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	11	11	11	11	11	11	12	9	10	12	10	12
Lane Width	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Total Lost time (s)	1.00	0.95	1.00	0.95	1.00	0.95	0.97	0.95	1.00	0.95	1.00	0.95
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Fit Protected	1.00	1.00	1.00	0.98	1.00	0.96	1.00	0.96	1.00	0.95	1.00	0.95
Satd. Flow (prot)	1555	3108	1555	3054	2808	2872	1501	2855	1501	2855	1501	2855
Fit Permitted	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	1555	3108	1555	3054	2808	2872	1501	2855	1501	2855	1501	2855
Volume (vph)	200	1087	5	45	743	100	423	490	200	225	300	145
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	208	1111	5	47	774	104	441	510	208	234	312	151
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	208	1116	0	47	868	0	441	670	0	234	401	0
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	1	6	5	2	3	8	7	4				
Permitted Phases												
Actuated Green, G (s)	15.3	37.9	5.4	28.0	18.1	27.7	9.0	18.6				
Effective Green, g (s)	17.3	39.9	7.4	30.0	20.1	29.7	11.0	20.6				
Actuated g/C Ratio	0.17	0.40	0.07	0.30	0.20	0.30	0.11	0.21				
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0				
Lane Grp Cap (vph)	269	1240	115	916	564	853	165	588				
v/s Ratio Prot	c0.13	c0.36	0.03	0.28	c0.16	c0.23	c0.16	0.14				
v/s Ratio Perm												
v/c Ratio	0.77	0.90	0.41	0.95	0.78	0.79	1.42	0.68				
Uniform Delay, d1	39.5	28.2	44.2	34.2	37.9	32.2	44.5	36.7				
Progression Factor	1.00	1.00	0.89	1.25	1.00	1.00	1.09	0.82				
Incremental Delay, d2	12.9	10.6	1.9	16.5	7.0	4.8	218.2	3.1				
Delay (s)	52.4	38.8	41.4	59.3	44.8	37.0	266.8	33.1				
Level of Service	D	D	D	E	D	D	F	C				
Approach Delay (s)												
Approach LOS	D	D	D	E	D	D	F	C				
Intersection Summary												
HCM Average Control Delay												
HCM Volume to Capacity ratio												
Actuated Cycle Length (s)												
Intersection Capacity Utilization												
Analysis Period (min)												
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis 2010 With-Project Conditions - PM Peak Hour  
22: Denny Way & Stewart St  
500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SSR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Total Lost time (s)	0.95	0.92	1.00	1.00	1.00	1.00	0.95	0.92	1.00	0.95	0.99	0.95
Lane Util. Factor	1.00	0.95	1.00	1.00	1.00	1.00	0.95	0.92	1.00	0.95	0.99	0.95
Fit Protected	1.00	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Satd. Flow (prot)	2972	2972	1593	1676	1593	1676	2972	2972	1593	1676	2972	2972
Fit Permitted	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	2972	2972	1593	1676	1593	1676	2972	2972	1593	1676	2972	2972
Volume (vph)	0	751	771	315	823	0	0	0	0	0	135	980
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	0	766	787	321	840	0	0	0	0	0	138	1000
RTOR Reduction (vph)	0	48	0	0	0	0	0	0	0	0	0	9
Lane Group Flow (vph)	0	1505	0	321	840	0	0	0	0	0	1200	0
Heavy Vehicles (%)	1%	1%	1%	2%	2%	2%	0%	0%	0%	0%	11%	11%
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	3	2	2	2	3	1	1					
Permitted Phases												
Actuated Green, G (s)	43.5	21.5	69.5									
Effective Green, g (s)	45.0	23.0	71.0									
Actuated g/C Ratio	0.45	0.23	0.71									
Clearance Time (s)	4.5	4.5	4.5									
Vehicle Extension (s)	3.0	3.0	3.0									
Lane Grp Cap (vph)	1337	366	1190									
v/s Ratio Prot	c0.51	c0.20	0.50									
v/s Ratio Perm												
v/c Ratio	1.13	0.88	0.71									
Uniform Delay, d1	27.5	37.1	8.4									
Progression Factor	0.89	1.00	1.00									
Incremental Delay, d2	66.1	24.4	1.9									
Delay (s)	90.7	61.5	10.4									
Level of Service	F	E	B									
Approach Delay (s)												
Approach LOS	F	F	C									
Intersection Summary												
HCM Average Control Delay												
HCM Volume to Capacity ratio												
Actuated Cycle Length (s)												
Intersection Capacity Utilization												
Analysis Period (min)												
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis 2010 With-Project Conditions - PM Peak Hour  
23: Yale St & Stewart St

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Total Lost time (s)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Util. Factor	1.00	0.85	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fit Protected	1.00	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	1693	1439	1593	1676	1676	1676	1676	1676	1676	1676	1676	1676
Fit Permitted	1.00	1.00	0.11	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (perm)	1693	1439	189	1676	1676	1676	1676	1676	1676	1676	1676	1676
Volume (vph)	0	661	110	60	5	0	0	0	0	390	900	5
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	0	703	117	64	5	0	0	0	0	415	957	5
RTOR Reduction (vph)	0	0	45	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	703	72	64	5	0	0	0	0	415	961	0
Heavy Vehicles (%)	1%	1%	1%	2%	2%	2%	0%	0%	0%	10%	10%	10%
Turn Type	3	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	3	3	3	3	3	3	3	3	3	3	3	3
Permitted Phases	43.5	43.5	43.5	43.5	43.5	43.5	43.5	43.5	43.5	43.5	43.5	43.5
Actuated Green, G (s)	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0
Effective Green, g (s)	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0
Actuated g/C Ratio	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Clearance Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Vehicle Extension (s)	762	648	85	754	754	754	754	754	754	754	754	754
Lane Grp Cap (vph)	c0.42	0.05	0.34	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
v/s Ratio Prot	0.92	0.11	0.75	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
v/s Ratio Perm	25.9	15.9	22.9	15.2	15.2	15.2	15.2	15.2	15.2	15.2	15.2	15.2
Uniform Delay, d1	0.79	0.24	0.99	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18
Progression Factor	12.9	0.1	21.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Incremental Delay, d2	33.3	3.8	44.0	17.9	17.9	17.9	17.9	17.9	17.9	17.9	17.9	17.9
Delay (s)	C	A	D	B	B	B	B	B	B	B	B	B
Level of Service	29.1	0.0	42.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Approach Delay (s)	C	C	D	D	D	D	D	D	D	D	D	D
Approach LOS	C	C	D	D	D	D	D	D	D	D	D	D
Intersection Summary												
HCM Average Control Delay	19.0											
HCM Volume to Capacity ratio	0.74											
Actuated Cycle Length (s)	100.0											
Intersection Capacity Utilization	76.4%											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis 2010 With-Project Conditions - PM Peak Hour  
24: Yale St & Howell St

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Total Lost time (s)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Util. Factor	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fit Protected	1.00	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	1593	1339	1593	1339	1339	1339	1339	1339	1339	1339	1339	1339
Fit Permitted	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (perm)	1593	1339	1593	1339	1339	1339	1339	1339	1339	1339	1339	1339
Volume (vph)	50	986	10	0	0	0	0	0	0	55	840	770
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	52	1027	10	0	0	0	0	0	0	57	875	802
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	63	0
Lane Group Flow (vph)	52	1037	0	0	0	0	0	0	0	932	739	0
Heavy Vehicles (%)	2%	2%	2%	0%	0%	0%	0%	0%	0%	4%	4%	2%
Parking (#/hr)	20	20	20	20	20	20	20	20	20	20	20	20
Turn Type	Split	Split	Split	Split	Split	Split	Split	Split	Split	Split	Split	Split
Protected Phases	2	2	2	2	2	2	2	2	2	2	2	2
Permitted Phases	55.0	55.0	55.0	55.0	55.0	55.0	55.0	55.0	55.0	55.0	55.0	55.0
Actuated Green, G (s)	57.0	57.0	57.0	57.0	57.0	57.0	57.0	57.0	57.0	57.0	57.0	57.0
Effective Green, g (s)	57.0	57.0	57.0	57.0	57.0	57.0	57.0	57.0	57.0	57.0	57.0	57.0
Actuated g/C Ratio	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	908	763	908	763	763	763	763	763	763	763	763	763
v/s Ratio Prot	0.03	c0.77	0.03	c0.77	c0.77	c0.77	c0.77	c0.77	c0.77	c0.77	c0.77	c0.77
v/s Ratio Perm	0.06	1.36	0.06	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36
Uniform Delay, d1	9.6	21.5	9.6	21.5	21.5	21.5	21.5	21.5	21.5	21.5	21.5	21.5
Progression Factor	1.47	1.59	1.47	1.59	1.59	1.59	1.59	1.59	1.59	1.59	1.59	1.59
Incremental Delay, d2	0.0	166.4	0.0	166.4	166.4	166.4	166.4	166.4	166.4	166.4	166.4	166.4
Delay (s)	14.1	200.7	14.1	200.7	200.7	200.7	200.7	200.7	200.7	200.7	200.7	200.7
Level of Service	B	F	B	F	F	F	F	F	F	F	F	F
Approach Delay (s)	191.8	191.8	191.8	191.8	191.8	191.8	191.8	191.8	191.8	191.8	191.8	191.8
Approach LOS	F	F	F	F	F	F	F	F	F	F	F	F
Intersection Summary												
HCM Average Control Delay	145.5											
HCM Volume to Capacity ratio	1.39											
Actuated Cycle Length (s)	100.0											
Intersection Capacity Utilization	118.0%											
Analysis Period (min)	15											
c Critical Lane Group												



HCM Unsignalized Intersection Capacity Analysis 2010 With-Project Conditions - PM Peak Hour  
25: Harrison St & Site Access

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↑	↑↑	↑↑	↑	↑	↑
Sign Control	Free	Free	Free	Stop	Stop	Stop
Grade	0%	0%	0%	0%	0%	0%
Volume (veh/h)	0	20	752	23	0	25
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	22	817	25	0	27
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type						None
Median storage (veh)						
Upstream signal (ft)		173				
pX, platoon unblocked						
vC, conflicting volume	842				852	285
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	842				852	285
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	96
cM capacity (veh/h)	789				299	712
Direction, Lane #	EB-1	WB-1	WB-2	WB-3	SB-1	SB-1
Volume Total	22	327	327	188	27	27
Volume Left	0	0	0	0	0	0
Volume Right	0	0	0	0	25	27
cSH	1700	1700	1700	1700	712	712
Volume to Capacity	0.01	0.19	0.19	0.11	0.04	0.04
Queue Length 95th (ft)	0	0	0	0	0	3
Control Delay (s)	0.0	0.0	0.0	0.0	10.3	10.3
Lane LOS					B	B
Approach Delay (s)	0.0	0.0			10.3	
Approach LOS					B	
Intersection Summary						
Average Delay				0.3		
Intersection Capacity Utilization				25.0%		
Analysis Period (min)				15		
ICU Level of Service				A		

HCM Unsignalized Intersection Capacity Analysis 2010 With-Project Conditions - PM Peak Hour  
26: Mercer St & Site Driveway

Movement	EBT	EBR	WBT	WBR	NBT	NBR
Lane Configurations	↑↑↑	↑↑↑	↑↑↑	↑↑↑	↑	↑
Sign Control	Free	Free	Free	Free	Stop	Stop
Grade	0%	0%	0%	0%	0%	0%
Volume (veh/h)	1733	3	0	0	0	197
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	1926	3	0	0	0	219
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type						None
Median storage (veh)						
Upstream signal (ft)	546				546	
pX, platoon unblocked						
vC, conflicting volume	1929				1927	483
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1929				1927	483
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	59
cM capacity (veh/h)	302				58	530
Direction, Lane #	EB-1	EB-2	EB-3	EB-4	NB-1	NB-1
Volume Total	550	550	550	278	219	219
Volume Left	0	0	0	0	0	0
Volume Right	0	0	0	0	3	219
cSH	1700	1700	1700	1700	530	530
Volume to Capacity	0.32	0.32	0.32	0.16	0.41	0.41
Queue Length 95th (ft)	0	0	0	0	0	50
Control Delay (s)	0.0	0.0	0.0	0.0	16.5	16.5
Lane LOS					C	C
Approach Delay (s)	0.0				16.5	
Approach LOS					C	
Intersection Summary						
Average Delay				1.7		
Intersection Capacity Utilization				44.0%		
Analysis Period (min)				15		
ICU Level of Service				A		

## 2025 Alternative 1

HCM Signalized Intersection Capacity Analysis 2025 Baseline Conditions - AM Peak Hour  
1: Roy St & 5th Ave

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	11	12	11	11	11	12	11	11	12
Total Lost time (s)												
Lane Util. Factor												
Frpb, ped/bikes												
Flpb, ped/bikes												
Flt Protected												
Satd. Flow (prot)												
Flt Permitted												
Satd. Flow (perm)												
Volume (vph)	0	0	0	40	45	5	400	155	60	15	245	65
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	42	47	5	421	163	63	16	258	68
RTOR Reduction (vph)	0	0	0	0	1	0	0	7	0	0	6	0
Lane Group Flow (vph)	0	0	0	0	93	0	349	291	0	16	320	0
Confl. Peds. (#/hr)												
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	6%	6%	6%	5%	5%	5%
Parking (#/hr)												
Turn Type	Split											
Protected Phases	Split											
Permitted Phases	Split											
Actuated Green, G (s)	36.0											
Effective Green, g (s)	39.0											
Actuated g/C Ratio	0.28											
Clearance Time (s)	6.0											
Lane Grp Cap (vph)	463											
v/s Ratio Prot	0.01											
v/s Ratio Perm	0.03											
Uniform Delay, d1	36.8											
Progression Factor	1.00											
Incremental Delay, d2	0.1											
Delay (s)	36.9											
Level of Service	D											
Approach Delay (s)	61.2											
Approach LOS	E											
Intersection Summary												
HCM Average Control Delay	C											
HCM Volume to Capacity ratio	9.0											
Actuated Cycle Length (s)	B											
Intersection Capacity Utilization												
Analysis Period (min)	15											
Critical Lane Group												

HCM Signalized Intersection Capacity Analysis 2025 Baseline Conditions - AM Peak Hour  
2: Broad St & 9th Ave

Movement	EBT	EBR	WBL	WBT	WBR	SBL	SBT	SBR	SBR2
Lane Configurations	4T		4T	4T			4T	4	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	10	10	11	12	9	8	12
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Util. Factor	0.95	1.00	0.95	1.00	0.95	1.00	0.91	1.00	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Flpb, ped/bikes	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	
Flt	0.94	1.00	0.99	1.00	0.99	1.00	1.00	0.85	
Flt Protected	1.00	0.95	1.00	1.00	0.99	1.00	0.99	1.00	
Satd. Flow (prot)	2871	1479	2938	2938	3760	1223	3760	1223	
Flt Permitted	1.00	0.21	1.00	1.00	0.99	1.00	0.99	1.00	
Satd. Flow (perm)	2871	328	2938	2938	3760	1223	3760	1223	
Volume (vph)	290	185	300	1845	155	170	695	105	5
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	309	197	319	1963	165	181	739	112	5
RTOR Reduction (vph)	86	0	0	0	0	0	0	1	0
Lane Group Flow (vph)	420	0	319	2128	0	0	920	116	0
Conf. Peds. (#/hr)		50			50				
Heavy Vehicles (%)	3%	3%	2%	2%	2%	3%	3%	3%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0	2	0	0
Parking (#/hr)							20		
Turn Type		pm+pt			Split		Prot		
Protected Phases	1	2	1	2	3	3	3	3	
Permitted Phases		1-2							
Actuated Green, G (s)	16.5	75.0	80.5	80.5	28.5	28.5	28.5	28.5	
Effective Green, g (s)	19.0	80.0	83.0	83.0	31.0	31.0	31.0	31.0	
Actuated g/C Ratio	0.16	0.67	0.69	0.69	0.26	0.26	0.26	0.26	
Clearance Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	455	804	2032	2032	971	316			
v/s Ratio Prot	0.15	0.20	0.72	0.72	0.24	0.09			
v/s Ratio Perm		0.06							
v/c Ratio	0.92	0.40	1.05	1.05	0.95	0.37			
Uniform Delay, d1	49.8	15.2	18.5	18.5	43.7	36.4			
Progression Factor	1.00	0.32	0.31	0.31	1.00	1.00			
Incremental Delay, d2	26.8	0.1	26.3	26.3	17.4	0.7			
Delay (s)	76.6	5.0	31.9	31.9	61.1	37.2			
Level of Service	E	A	C	C	E	D			
Approach Delay (s)	76.6		28.4		58.4				
Approach LOS	E		C		E				
Intersection Summary									
HCM Average Control Delay	42.3				HCM Level of Service				D
HCM Volume to Capacity ratio	1.02								
Actuated Cycle Length (s)	120.0				Sum of lost time (s)				6.0
Intersection Capacity Utilization	87.6%				ICU Level of Service				E
Analysis Period (min)	15								
c Critical Lane Group									

HCM Signalized Intersection Capacity Analysis 2025 Baseline Conditions - AM Peak Hour  
3: Broad St & Westlake Ave 500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4P	4P	4P	4P	4P	4P	4P	4P	4P	4P	4P	4P
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	12	12	10	12	12	10	12	12	12	12
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00
Frpb, ped/bikes	0.96	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.96	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.97	1.00	1.00	0.95	1.00	0.91	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	2953	1608	3002	1439	1531	2705	1624	1710	1624	1710	1624	1710
Flt Permitted	0.79	0.47	1.00	1.00	0.26	1.00	0.15	1.00	0.15	1.00	0.15	1.00
Satd. Flow (perm)	2338	797	3002	1439	416	2705	253	1710	253	1710	253	1710
Volume (vph)	15	355	80	355	2140	835	65	240	360	75	280	0
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	16	370	83	370	2229	870	68	250	375	78	292	0
RTOR Reduction (vph)	0	15	0	0	0	71	0	225	0	0	0	0
Lane Group Flow (vph)	0	454	0	370	2229	799	68	400	0	78	292	0
Conf. Ped. (#/hr)	50	50	50	50	50	50	50	50	50	50	50	50
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	2%	2%	0%	0%
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	2	2	2	2	2	2	2	2	2	2	2	2
Permitted Phases	2	2	2	2	2	2	2	2	2	2	2	2
Actuated Green, G (s)	84.5	84.5	84.5	84.5	24.5	24.5	24.5	24.5	24.5	24.5	24.5	24.5
Effective Green, g (s)	87.0	87.0	87.0	87.0	27.0	27.0	27.0	27.0	27.0	27.0	27.0	27.0
Actuated g/C Ratio	0.72	0.72	0.72	0.72	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22
Clearance Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1695	578	2176	1043	94	609	57	385	57	385	57	385
v/s Ratio Prot	0.19	0.46	0.56	0.16	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
v/s Ratio Perm	0.27	0.64	1.02	0.77	0.72	0.66	1.37	0.76	1.37	0.76	1.37	0.76
Uniform Delay, d1	5.6	8.5	16.5	10.2	43.0	42.3	46.5	43.5	46.5	43.5	46.5	43.5
Progression Factor	0.56	0.62	0.57	0.49	1.32	1.90	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.0	1.5	21.9	2.2	20.4	2.6	245.1	13.1	245.1	13.1	245.1	13.1
Delay (s)	3.2	6.8	31.3	7.2	77.3	82.9	291.6	56.6	291.6	56.6	291.6	56.6
Level of Service	A	A	C	A	E	F	F	E	F	E	F	E
Approach Delay (s)	3.2	22.6	22.6	22.6	82.3	82.3	106.1	106.1	106.1	106.1	106.1	106.1
Approach LOS	A	C	C	C	F	F	F	F	F	F	F	F
Intersection Summary												
HCM Average Control Delay	35.2											
HCM Volume to Capacity ratio	1.11											
Actuated Cycle Length (s)	120.0											
Intersection Capacity Utilization	120.1%											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis 2025 Baseline Conditions - AM Peak Hour  
4: Valley St & Fairview Ave 500 Fifth Avenue North

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	4P	4P	4P	4P	4P	4P
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	10	12	12	12	12	12
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	1.00	1.00	1.00	0.95	1.00
Frpb	1.00	0.85	1.00	1.00	1.00	0.85
Flpb Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	2944	1411	812	3124	4491	1425
Flt Permitted	1.00	1.00	0.13	1.00	0.95	1.00
Satd. Flow (perm)	2944	1411	114	3124	4491	1425
Volume (vph)	685	20	5	785	2430	685
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	729	21	5	835	2585	729
RTOR Reduction (vph)	0	5	0	0	0	6
Lane Group Flow (vph)	729	16	5	835	2585	723
Heavy Vehicles (%)	3%	3%	100%	4%	2%	2%
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	3	3	4	2	2
Permitted Phases	4	3	3	4	2	2
Actuated Green, G (s)	28.0	28.0	37.0	42.0	68.0	82.0
Effective Green, g (s)	30.0	30.0	41.0	44.0	70.0	84.0
Actuated g/C Ratio	0.25	0.25	0.25	0.34	0.37	0.58
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	736	353	103	1145	2620	998
v/s Ratio Prot	0.25	0.00	0.27	0.58	0.51	0.51
v/s Ratio Perm	0.01	0.01	0.01	0.01	0.01	0.01
v/c Ratio	0.99	0.04	0.05	0.73	0.99	0.72
Uniform Delay, d1	44.9	34.1	28.1	32.9	24.5	11.0
Progression Factor	1.38	1.58	1.00	1.00	1.26	1.31
Incremental Delay, d2	29.3	0.2	0.2	2.4	3.0	0.2
Delay (s)	91.3	54.2	28.3	35.2	33.9	14.6
Level of Service	F	D	C	D	C	B
Approach Delay (s)	90.2	35.2	29.7	35.2	29.7	29.7
Approach LOS	F	D	C	D	C	C
Intersection Summary						
HCM Average Control Delay	39.9					
HCM Volume to Capacity ratio	0.95					
Actuated Cycle Length (s)	120.0					
Intersection Capacity Utilization	82.1%					
Analysis Period (min)	15					
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis 2025 Baseline Conditions - AM Peak Hour  
5: Mercer St & 1st Avenue 500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Flt Protected	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Permitted	3298	3298	3298	3298	3298	3298	3298	3298	3298	3298	3298	3298
Satd. Flow (perm)	3298	3298	3298	3298	3298	3298	3298	3298	3298	3298	3298	3298
Volume (vph)	45	1245	0	0	0	0	0	75	205	125	0	0
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	47	1297	0	0	0	0	0	78	214	130	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	38	0	0	0
Lane Group Flow (vph)	0	1344	0	0	0	0	0	78	306	0	0	0
Heavy Vehicles (%)	3%	3%	3%	0%	0%	0%	0%	10%	10%	10%	0%	0%
Parking (#/hr)	3	3	3	3	3	3	3	3	3	3	3	3
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	1	2	2	2	2	2	2	2	2	2	2	2
Permitted Phases	1	2	2	2	2	2	2	2	2	2	2	2
Actuated Green, G (s)	46.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0
Effective Green, g (s)	47.0	27.0	27.0	27.0	27.0	27.0	27.0	27.0	27.0	27.0	27.0	27.0
Actuated g/C Ratio	0.59	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Grp Cap (vph)	1938	554	972	554	972	554	972	554	972	554	972	554
v/s Ratio Prot	0.41	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
v/s Ratio Perm	0.69	0.14	0.32	0.14	0.32	0.14	0.32	0.14	0.32	0.14	0.32	0.14
Uniform Delay, d1	11.5	18.4	19.6	18.4	19.6	18.4	19.6	18.4	19.6	18.4	19.6	18.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.1	0.5	0.8	0.5	0.8	0.5	0.8	0.5	0.8	0.5	0.8	0.5
Delay (s)	13.6	19.0	20.5	19.0	20.5	19.0	20.5	19.0	20.5	19.0	20.5	19.0
Level of Service	B	B	C	B	C	B	C	B	C	B	C	B
Approach Delay (s)	13.6	19.0	20.5	19.0	20.5	19.0	20.5	19.0	20.5	19.0	20.5	19.0
Approach LOS	B	B	C	B	C	B	C	B	C	B	C	B
Intersection Summary												
HCM Average Control Delay	15.1	15.1	15.1	15.1	15.1	15.1	15.1	15.1	15.1	15.1	15.1	15.1
HCM Volume to Capacity ratio	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56
Actuated Cycle Length (s)	80.0	80.0	80.0	80.0	80.0	80.0	80.0	80.0	80.0	80.0	80.0	80.0
Intersection Capacity Utilization	57.4%	57.4%	57.4%	57.4%	57.4%	57.4%	57.4%	57.4%	57.4%	57.4%	57.4%	57.4%
Analysis Period (min)	15	15	15	15	15	15	15	15	15	15	15	15
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis 2025 Baseline Conditions - AM Peak Hour  
6: Mercer St & 5th Ave 500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4↑↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	11	12	12	12	11	11	11	11	11	12
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.86	1.00	0.86	1.00	0.86	1.00	0.86	1.00	0.86	1.00	0.86	1.00
Flt Protected	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Permitted	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (perm)	5723	1303	5723	1303	5723	1303	5723	1303	5723	1303	5723	1303
Volume (vph)	15	1235	180	0	0	0	0	595	270	100	205	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	16	1300	189	0	0	0	0	626	284	105	216	0
RTOR Reduction (vph)	0	0	38	0	0	0	0	0	176	0	0	0
Lane Group Flow (vph)	0	1316	151	0	0	0	0	626	108	72	249	0
Heavy Vehicles (%)	4%	4%	4%	0%	0%	0%	0%	5%	5%	5%	5%	5%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)	25	25	25	25	25	25	25	25	25	25	25	25
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	2	2	2	2	2	2	2	2	2	2	2	2
Permitted Phases	2	2	2	2	2	2	2	2	2	2	2	2
Actuated Green, G (s)	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0
Effective Green, g (s)	46.0	46.0	46.0	46.0	46.0	46.0	46.0	46.0	46.0	46.0	46.0	46.0
Actuated g/C Ratio	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lane Grp Cap (vph)	1880	428	428	1880	428	428	1880	428	428	1880	428	428
v/s Ratio Prot	0.23	0.12	0.12	0.23	0.12	0.12	0.23	0.12	0.12	0.23	0.12	0.12
v/s Ratio Perm	0.70	0.35	0.35	0.70	0.35	0.35	0.70	0.35	0.35	0.70	0.35	0.35
Uniform Delay, d1	41.0	35.7	35.7	41.0	35.7	35.7	41.0	35.7	35.7	41.0	35.7	35.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.2	2.3	2.3	2.2	2.3	2.3	2.2	2.3	2.3	2.2	2.3	2.3
Delay (s)	43.2	38.0	38.0	43.2	38.0	38.0	43.2	38.0	38.0	43.2	38.0	38.0
Level of Service	D	D	D	D	D	D	D	D	D	D	D	D
Approach Delay (s)	42.5	38.0	38.0	42.5	38.0	38.0	42.5	38.0	38.0	42.5	38.0	38.0
Approach LOS	D	D	D	D	D	D	D	D	D	D	D	D
Intersection Summary												
HCM Average Control Delay	45.9	45.9	45.9	45.9	45.9	45.9	45.9	45.9	45.9	45.9	45.9	45.9
HCM Volume to Capacity ratio	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49
Actuated Cycle Length (s)	140.0	140.0	140.0	140.0	140.0	140.0	140.0	140.0	140.0	140.0	140.0	140.0
Intersection Capacity Utilization	61.9%	61.9%	61.9%	61.9%	61.9%	61.9%	61.9%	61.9%	61.9%	61.9%	61.9%	61.9%
Analysis Period (min)	15	15	15	15	15	15	15	15	15	15	15	15
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis 2025 Baseline Conditions - AM Peak Hour  
7: Mercer St & Dexter Avenue 500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBR	NBT	NBR	SBT	NEL	NER	NER2
Lane Configurations	4TTL	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	12	12	12	10	11	10	12	12	12	12
Lane Width	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Total Lost time (s)	0.86	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95
Lane Util. Factor	0.86	0.86	1.00	0.85	1.00	1.00	0.87	0.85	1.00	0.85
Flt	0.99	1.00	1.00	1.00	0.95	1.00	0.99	1.00	1.00	1.00
Flt Protected	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	5684	1382	2861	1326	1501	3217	1441	1341	1341	1341
Flt Permitted	1.00	1.00	1.00	1.00	0.49	1.00	0.99	1.00	1.00	1.00
Satd. Flow (perm)	5684	1382	2861	1326	769	3217	1441	1341	1341	1341
Volume (vph)	130	1770	155	35	195	70	250	595	30	300
Peak-hour factor, PHF	0.85	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	148	2011	176	40	222	80	284	676	34	341
RTOR Reduction (vph)	0	0	22	0	29	0	0	0	0	1
Lane Group Flow (vph)	0	2335	0	18	222	51	284	676	205	175
Heavy Vehicles (%)	2%	2%	2%	7%	6%	6%	1%	1%	3%	3%
Turn Type	Perm	1	custom	1	4	3	7	2	2	2
Protected Phases	1	1	1	1	1	1	1	1	1	1
Permitted Phases	1	1	1	1	1	1	1	1	1	1
Actuated Green, G (s)	60.0	60.0	30.0	30.0	48.0	48.0	14.0	14.0	14.0	14.0
Effective Green, g (s)	63.0	63.0	33.0	33.0	51.0	51.0	17.0	17.0	17.0	17.0
Actuated g/C Ratio	0.45	0.45	0.24	0.24	0.36	0.36	0.12	0.12	0.12	0.12
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lane Grp Cap (vph)	2558	622	674	313	359	1172	175	163	163	163
v/s Ratio Prot	0.01	0.03	0.08	0.21	c0.14	c0.14	0.13	0.13	0.13	0.13
v/s Ratio Perm	0.41	0.91	0.33	0.16	0.79	0.58	1.17	1.07	1.07	1.07
Uniform Delay, d1	35.9	21.5	44.3	42.5	37.4	35.8	61.5	61.5	61.5	61.5
Progression Factor	0.82	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	6.0	0.1	1.3	1.1	16.2	2.1	121.7	91.7	91.7	91.7
Delay (s)	35.7	21.5	45.6	43.6	53.6	37.9	183.2	153.2	153.2	153.2
Level of Service	D	C	D	D	D	D	D	F	F	F
Approach Delay (s)	35.7	45.1	45.1	45.1	45.1	45.1	169.3	169.3	169.3	169.3
Approach LOS	D	D	D	D	D	D	F	F	F	F
Intersection Summary										
HCM Average Control Delay	50.6									
HCM Volume to Capacity ratio	0.90									
Actuated Cycle Length (s)	140.0									
Intersection Capacity Utilization	82.3%									
Analysis Period (min)	15									
c Critical Lane Group										

HCM Signalized Intersection Capacity Analysis 2025 Baseline Conditions - AM Peak Hour  
8: Mercer St & 9th Ave 500 Fifth Avenue North

Movement	EBT	EBR	SBT	SEB	SEB	SEB
Lane Configurations	1TTL	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	11	12	12	9	12	11
Lane Width	3.0	3.0	3.0	3.0	3.0	3.0
Total Lost time (s)	0.86	1.00	0.91	0.91	1.00	0.91
Lane Util. Factor	0.86	1.00	1.00	1.00	0.99	0.99
Flt	0.99	1.00	1.00	1.00	0.99	0.99
Flt Protected	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	5535	1251	2647	2647	2647	2647
Flt Permitted	1.00	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	5535	1251	2647	2647	2647	2647
Volume (vph)	2115	105	485	825	35	0
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	2274	113	500	887	38	0
RTOR Reduction (vph)	6	0	4	3	0	0
Lane Group Flow (vph)	2361	0	453	965	0	0
Heavy Vehicles (%)	2%	2%	4%	4%	4%	0%
Bus Blockages (#/hr)	0	0	0	2	0	0
Turn Type	Perm	Perm	Perm	custom	custom	custom
Protected Phases	1	2	2	2	2	2
Permitted Phases	1	2	2	2	2	2
Actuated Green, G (s)	70.5	38.5	38.5	38.5	38.5	38.5
Effective Green, g (s)	73.0	41.0	41.0	41.0	41.0	41.0
Actuated g/C Ratio	0.61	0.34	0.34	0.34	0.34	0.34
Clearance Time (s)	5.5	5.5	5.5	5.5	5.5	5.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	3367	427	904	904	904	904
v/s Ratio Prot	c0.43	0.36	0.36	0.36	0.36	0.36
v/s Ratio Perm	0.71	1.06	1.06	1.06	1.06	1.06
Uniform Delay, d1	16.2	39.5	39.5	39.5	39.5	39.5
Progression Factor	1.00	0.70	0.71	0.71	0.71	0.71
Incremental Delay, d2	1.3	53.5	45.2	45.2	45.2	45.2
Delay (s)	17.4	81.2	73.2	73.2	73.2	73.2
Level of Service	B	F	F	F	F	F
Approach Delay (s)	17.4	75.8	75.8	75.8	75.8	75.8
Approach LOS	B	E	E	E	E	E
Intersection Summary						
HCM Average Control Delay	39.2					
HCM Volume to Capacity ratio	0.84					
Actuated Cycle Length (s)	120.0					
Intersection Capacity Utilization	70.4%					
Analysis Period (min)	15					
f Phase conflict between lane groups.						
c Critical Lane Group						



HCM Signalized Intersection Capacity Analysis 2025 Baseline Conditions - AM Peak Hour  
9. Mercer St & Westlake Ave 500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR	SBR
Lane Configurations	41114											
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	12	12	12	12	12	11	12	12	12	12
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.86	1.00	1.00	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Flt Protected	0.99	1.00	1.00	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Satd. Flow (prot)	5532	5532	5532	2893	1272	1272	2893	1272	1272	1272	1272	1272
Flt Permitted	0.99	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Satd. Flow (perm)	5532	5532	5532	2893	1272	1272	2893	1272	1272	1272	1272	1272
Volume (vph)	310	2620	50	0	0	0	0	380	120	205	330	0
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	323	2729	52	0	0	0	0	396	125	214	344	0
RTOR Reduction (vph)	0	2	0	0	0	0	0	0	35	0	0	0
Lane Group Flow (vph)	0	3102	0	0	0	0	0	396	90	214	344	0
Heavy Vehicles (%)	2%	2%	2%	0%	0%	0%	0%	4%	4%	0%	0%	0%
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Prot	Prot	Prot
Protected Phases	4	4	4	4	4	4	4	6	5	2	2	2
Permitted Phases	4	4	4	4	4	4	4	6	5	2	2	2
Actuated Green, G (s)	68.6	68.6	68.6	17.8	17.8	17.8	17.8	17.8	16.3	16.3	40.4	40.4
Effective Green, g (s)	71.1	71.1	71.1	20.6	20.6	20.6	20.6	20.6	19.3	19.3	42.9	42.9
Actuated g/C Ratio	0.59	0.59	0.59	0.17	0.17	0.17	0.17	0.17	0.16	0.16	0.36	0.36
Clearance Time (s)	5.5	5.5	5.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	5.5	5.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	3278	3278	3278	497	218	261	611	611	611	611	611	611
v/s Ratio Prot	0.56	0.56	0.56	0.14	0.14	0.14	0.14	0.14	0.13	0.13	0.20	0.20
v/s Ratio Perm	0.95	0.95	0.95	0.80	0.41	0.82	0.56	0.56	0.56	0.56	0.56	0.56
Uniform Delay, d1	22.7	22.7	22.7	47.7	44.3	48.7	31.0	31.0	31.0	31.0	31.0	31.0
Progression Factor	0.68	0.68	0.68	0.92	0.87	0.89	0.79	0.79	0.79	0.79	0.79	0.79
Incremental Delay, d2	5.6	5.6	5.6	8.6	1.3	14.1	0.9	0.9	0.9	0.9	0.9	0.9
Delay (s)	21.1	21.1	21.1	52.5	39.8	57.5	25.3	25.3	25.3	25.3	25.3	25.3
Level of Service	C	C	C	D	D	D	E	E	E	E	E	E
Approach Delay (s)	21.1	21.1	21.1	0.0	0.0	0.0	37.6	37.6	37.6	37.6	37.6	37.6
Approach LOS	C	C	C	A	A	A	D	D	D	D	D	D
Intersection Summary												
HCM Average Control Delay	26.8											
HCM Volume to Capacity ratio	0.90											
Actuated Cycle Length (s)	120.0											
Intersection Capacity Utilization	84.1%											
Analysis Period (min)	15											
Critical Lane Group												

HCM Signalized Intersection Capacity Analysis 2025 Baseline Conditions - AM Peak Hour  
10. Mercer St & Fairview Ave 500 Fifth Avenue North

Movement	EBL	EBT	EBR	EBR2	WBL	WBR	NBT	NBR	NBR2	SBT
Lane Configurations	←←←	←	←	←	←←	←	←	←	←	←
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	12	12	12	12	10	12	12	12
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.91	1.00	1.00	0.97	0.88	1.00	0.88	1.00	1.00	1.00
Fit Protected	1.00	0.85	1.00	0.85	1.00	0.85	1.00	0.85	1.00	1.00
Satd. Flow (prot)	4423	1425	3120	2533	1550	2484	1413	1413	1413	1413
Fit Permitted	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (perm)	4423	1425	3120	2533	1550	2484	1413	1413	1413	1413
Volume (vph)	10	2185	410	150	1545	2870	280	385	10	35
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	10	2253	423	155	1593	2959	289	397	10	36
RTOR Reduction (vph)	0	0	11	0	64	0	1	0	0	0
Lane Group Flow (vph)	0	2263	567	0	1593	2895	289	406	0	36
Heavy Vehicles (%)	2%	2%	2%	2%	1%	1%	3%	3%	3%	21%
Turn Type	Split	Prot	Prot	Prot	Prot	Prot	custom	pt+ov		
Protected Phases	1	1	1	2	1	2	3	2	3	3
Permitted Phases				1						
Actuated Green, G (s)	45.5	45.5	37.5	88.5	16.5	59.5		16.5		
Effective Green, g (s)	48.0	48.0	40.0	91.0	23.0	66.0		23.0		
Actuated g/C Ratio	0.40	0.40	0.33	0.76	0.19	0.55		0.19		
Clearance Time (s)	5.5	5.5	5.5	5.5	9.5	9.5		9.5		
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0		
Lane Grp Cap (vph)	1769	570	1040	1921	297	1366		271		
v/s Ratio Prot	0.51	0.40	0.51	0.14	0.19	0.16		0.03		
v/s Ratio Perm										
v/c Ratio	1.28	1.00	1.53	1.51	0.97	0.30		0.13		
Uniform Delay, d1	36.0	35.9	40.0	14.5	48.2	14.5		40.2		
Progression Factor	0.81	0.82	1.00	1.00	1.00	1.00		1.12		
Incremental Delay, d2	128.8	30.4	244.2	231.0	44.6	0.1		0.2		
Delay (s)	158.0	59.6	284.2	245.5	92.8	14.6		45.2		
Level of Service	F	E	F	F	F	B		D		
Approach Delay (s)	138.0				47.1			45.2		
Approach LOS	F				D			D		
Intersection Summary										
HCM Average Control Delay	197.6									
HCM Volume to Capacity ratio	1.40									
Actuated Cycle Length (s)	120.0									
Intersection Capacity Utilization	185.1%									
Analysis Period (min)	15									
! Phase conflict between lane groups.										
c Critical Lane Group										

HCM Signalized Intersection Capacity Analysis 2025 Baseline Conditions - AM Peak Hour  
11: Republican St & 5th Ave 500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	0.95	1.00	0.91	1.00	0.95	1.00	0.99	1.00	0.95	1.00	0.95
Frpb, ped/bikes	1.00	0.97	1.00	1.00	1.00	1.00	1.00	0.99	1.00	0.98	1.00	0.98
Flpb, ped/bikes	0.98	1.00	0.75	1.00	1.00	0.98	1.00	0.98	1.00	0.98	1.00	0.98
Flt	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.98	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Satd. Flow (prot)	1253	1079	1230	4667	1601	3235	1601	3235	1601	3235	1601	3235
Flt Permitted	0.98	1.00	0.54	1.00	0.32	1.00	0.32	1.00	0.32	1.00	0.32	1.00
Satd. Flow (perm)	1253	1079	699	4667	531	3235	531	3235	531	3235	531	3235
Volume (vph)	0	0	0	5	5	15	810	15	10	340	5	5
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	0	0	0	5	5	15	827	15	10	347	5	5
RTOR Reduction (vph)	0	0	0	0	0	4	0	1	0	0	0	0
Lane Group Flow (vph)	0	0	0	10	1	15	841	0	10	352	0	0
Confl. Peds. (#/hr)	10	20	20	10	75	20	20	20	20	75	10	20
Heavy Vehicles (%)	0%	0%	0%	33%	33%	33%	7%	7%	7%	7%	7%	7%
Parking (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	6	6	6	8	8	8	8	8	8	8	8	8
Permitted Phases	6	6	6	8	8	8	8	8	8	8	8	8
Actuated Green, G (s)	20.0	20.0	109.0	109.0	109.0	109.0	109.0	109.0	109.0	109.0	109.0	109.0
Effective Green, g (s)	22.0	22.0	112.0	112.0	112.0	112.0	112.0	112.0	112.0	112.0	112.0	112.0
Actuated g/C Ratio	0.16	0.16	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Clearance Time (s)	5.0	5.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	197	170	559	3734	425	2588	425	2588	425	2588	425	2588
v/s Ratio Prot	0.01	0.00	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
v/s Ratio Perm	0.05	0.00	0.03	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23
Uniform Delay, d1	50.1	49.8	2.9	3.4	2.9	3.1	2.9	3.1	2.9	3.1	2.9	3.1
Progression Factor	1.00	1.00	2.71	3.09	0.82	1.13	0.82	1.13	0.82	1.13	0.82	1.13
Incremental Delay, d2	0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Delay (s)	50.2	49.8	7.8	10.7	2.4	3.7	2.4	3.7	2.4	3.7	2.4	3.7
Level of Service	D	D	A	B	A	A	A	A	A	A	A	A
Approach Delay (s)	50.1	49.8	7.8	10.7	2.4	3.7	2.4	3.7	2.4	3.7	2.4	3.7
Approach LOS	A	A	B	B	A	A	A	A	A	A	A	A
Intersection Summary												
HCM Average Control Delay	9.0											
HCM Volume to Capacity ratio	0.20											
Actuated Cycle Length (s)	140.0											
Intersection Capacity Utilization	31.6%											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis 2025 Baseline Conditions - AM Peak Hour  
12: Harrison St & 5th Ave 500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.87	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt	1.00	0.92	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	1687	1421	1363	2720	1363	2720	1363	2720	1363	2720	1363	2720
Flt Permitted	0.68	1.00	0.79	1.00	0.51	1.00	0.51	1.00	0.51	1.00	0.51	1.00
Satd. Flow (perm)	1212	1421	1116	2720	725	2920	725	2920	725	2920	725	2920
Volume (vph)	5	5	5	55	10	555	10	260	5	5	350	5
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	5	5	5	60	11	610	11	286	5	5	385	5
RTOR Reduction (vph)	0	4	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	5	6	0	0	71	610	11	291	0	0	395	0
Confl. Peds. (#/hr)	100	100	100	100	185	185	115	115	115	115	185	185
Heavy Vehicles (%)	7%	7%	7%	1%	1%	1%	1%	19%	19%	19%	8%	8%
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	2	2	2	6	6	6	8	8	8	8	8	8
Permitted Phases	2	2	2	6	6	6	8	8	8	8	8	8
Actuated Green, G (s)	33.0	33.0	33.0	33.0	33.0	33.0	97.0	97.0	97.0	97.0	97.0	97.0
Effective Green, g (s)	34.0	34.0	34.0	34.0	34.0	34.0	100.0	100.0	100.0	100.0	100.0	100.0
Actuated g/C Ratio	0.24	0.24	0.24	0.24	0.24	0.24	0.71	0.71	0.71	0.71	0.71	0.71
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	294	345	271	661	518	2086	2186	2186	2186	2186	2186	2186
v/s Ratio Prot	0.00	0.00	0.00	0.06	0.02	0.02	0.10	0.10	0.10	0.10	0.10	0.10
v/s Ratio Perm	0.02	0.02	0.02	0.26	0.92	0.02	0.14	0.14	0.14	0.14	0.14	0.14
Uniform Delay, d1	40.3	40.3	42.9	51.7	5.8	6.3	6.6	6.6	6.6	6.6	6.6	6.6
Progression Factor	1.00	1.00	1.00	1.00	0.36	0.36	0.25	0.25	0.25	0.25	0.25	0.25
Incremental Delay, d2	0.0	0.0	0.0	0.5	18.5	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Delay (s)	40.3	40.3	43.4	70.2	2.2	2.4	1.8	1.8	1.8	1.8	1.8	1.8
Level of Service	D	D	D	E	A	A	A	A	A	A	A	A
Approach Delay (s)	40.3	40.3	43.4	70.2	2.2	2.4	1.8	1.8	1.8	1.8	1.8	1.8
Approach LOS	D	D	D	E	A	A	A	A	A	A	A	A
Intersection Summary												
HCM Average Control Delay	34.4											
HCM Volume to Capacity ratio	0.37											
Actuated Cycle Length (s)	140.0											
Intersection Capacity Utilization	55.8%											
Analysis Period (min)	15											
c Critical Lane Group												



HCM Unsignalized Intersection Capacity Analysis 2025 Baseline Conditions - AM Peak Hour  
13: Harrison St & Broad St

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
Sign Control	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Grade	0	0	5	0	0	0	0	340	5	0	1330	460
Volume (veh/h)	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Peak Hour Factor	0	0	6	0	0	0	0	382	6	0	1494	517
Hourly flow rate (vph)	0	0	6	0	0	0	0	382	6	0	1494	517
Pedestrians	20											
Lane Width (ft)	11.0											
Walking Speed (ft/s)	4.0											
Percent Blockage	2											
Right turn flare (veh)												
Median type	None											
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1964	2160	1026	1132	2416	194	2031					388
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1964	2160	1026	1132	2416	194	2031					388
IC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1					4.1
IC, 2 stage (s)												
IF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2					2.2
p0 queue free %	100	100	98	100	100	100	100					100
cM capacity (veh/h)	38	47	232	155	33	821	275					1167
Direction Lane #	EB 1	WB 1	NE 1	NE 2	SW 1	SW 2						
Volume Total	6	0	255	133	996	1015						
Volume Left	0	0	0	0	0	0						
Volume Right	6	0	0	6	0	517						
cSH	232	1700	1700	1700	1700	1700						
Volume to Capacity	0.02	0.00	0.15	0.08	0.59	0.60						
Queue Length 95th (ft)	2	0	0	0	0	0						
Control Delay (s)	20.9	0.0	0.0	0.0	0.0	0.0						
Lane LOS	C	A										
Approach Delay (s)	20.9	0.0	0.0	0.0	0.0	0.0						
Approach LOS	C	A										
Intersection Summary												
Average Delay			0.0									
Intersection Capacity Utilization			62.0%									
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis 2025 Baseline Conditions - AM Peak Hour  
14: 5th Ave & Broad St

Movement	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations	1P	1P	1P	1P	1P	1P	1P	1P	1P	1P	1P	1P
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	12	12	11	11	11	11	12	11	11	12
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	0.97	1.00	0.75	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt	0.98	1.00	0.85	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	1.00	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	3093	3093	3298	1150	1586	3172	1631	3255				
Flt Permitted	1.00	1.00	1.00	1.00	0.95	1.00	0.95	1.00				
Satd. Flow (perm)	3093	3093	3298	1150	1586	3172	1631	3255				
Volume (vph)	0	200	35	0	345	85	75	310	0	105	1185	5
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	0	202	35	0	348	86	76	313	0	106	1197	5
RTOR, Reduction (vph)	0	10	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	227	0	0	348	86	76	313	0	106	1202	0
Conf. Peds. (#/hr)	115	85	85	115	130	45	45	130				
Heavy Vehicles (%)	3%	3%	3%	2%	2%	2%	10%	10%	10%	7%	7%	7%
Bus Blockages (#/hr)	0	20	0	0	18	0	0	0	0	0	0	0
Turn Type												
Protected Phases	8			4		5	2			1		6
Permitted Phases												
Actuated Green, G(s)	43.0			43.0		43.0	29.0	47.0		29.0		47.0
Effective Green, g (s)	49.0			49.0		49.0	32.0	50.0		32.0		50.0
Actuated g/C Ratio	0.35			0.35		0.35	0.23	0.36		0.23		0.36
Clearance Time (s)	9.0			9.0		9.0	6.0	6.0		6.0		6.0
Lane Grp Cap (vph)	1083			1154		403	363	1133		373		1163
v/s Ratio Prot	0.07			c0.11		0.05	0.10	c0.07		c0.37		
v/s Ratio Perm						0.07						
v/c Ratio	0.21			0.30		0.21	0.21	0.28		0.28		1.03
Uniform Delay, d1	31.9			33.1		32.0	43.8	32.1		44.6		45.0
Progression Factor	1.05			1.04		1.05	0.98	0.89		1.00		1.00
Incremental Delay, d2	0.4			0.7		1.2	1.3	0.6		1.9		35.4
Delay (s)	33.8			34.9		34.6	44.3	29.2		46.5		80.4
Level of Service	C			C		C	D	C		D		F
Approach Delay (s)	33.8			34.9			32.2			77.7		
Approach LOS	C			C			C			E		
Intersection Summary												
HCM Average Control Delay				58.0						E		
HCM Volume to Capacity ratio				0.58								
Actuated Cycle Length (s)				140.0						9.0		
Intersection Capacity Utilization				65.4%						C		
Analysis Period (min)				15								
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis 2025 Baseline Conditions - AM Peak Hour  
15: Denny Way & 1st Avenue 500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SBL	SBR	NWL	NWR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Flt	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Flt Protected	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	3444	3444	3444	3444	3444	3444	3444	3444	3444	3444
Flt Permitted	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (perm)	3444	3444	3444	3444	3444	3444	3444	3444	3444	3444
Volume (vph)	0	2100	275	0	1035	345	0	0	170	10
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	0	2165	284	0	1067	356	0	0	175	10
RTOR Reduction (vph)	0	10	0	0	60	0	0	0	0	0
Lane Group Flow (vph)	0	2439	0	0	1363	0	0	0	175	10
Heavy Vehicles (%)	3%	3%	3%	4%	4%	4%	0%	0%	11%	11%
Parking (#/hr)	0	0	0	0	0	0	0	0	0	0
Turn Type	Protected Phases	1	1	1	1	1	1	1	1	1
Permitted Phases	Permitted Phases	69.0	69.0	69.0	69.0	69.0	69.0	69.0	69.0	69.0
Actuated Green, G (s)	71.0	71.0	71.0	71.0	71.0	71.0	71.0	71.0	71.0	71.0
Effective Green, g (s)	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71
Actuated g/C Ratio	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Clearance Time (s)	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71
Lane Grp Cap (vph)	2445	2445	2445	2445	2445	2445	2445	2445	2445	2445
v/s Ratio Prot	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71
v/s Ratio Perm	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay, d1	14.4	14.4	14.4	14.4	14.4	14.4	14.4	14.4	14.4	14.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	17.6	17.6	17.6	17.6	17.6	17.6	17.6	17.6	17.6	17.6
Delay (s)	32.0	32.0	32.0	32.0	32.0	32.0	32.0	32.0	32.0	32.0
Level of Service	C	C	C	C	C	C	C	C	C	C
Approach Delay (s)	32.0	32.0	32.0	32.0	32.0	32.0	32.0	32.0	32.0	32.0
Approach LOS	C	C	C	C	C	C	C	C	C	C
Intersection Summary										
HCM Average Control Delay	23.3	23.3	23.3	23.3	23.3	23.3	23.3	23.3	23.3	23.3
HCM Volume to Capacity ratio	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Actuated Cycle Length (s)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Intersection Capacity Utilization	89.3%	89.3%	89.3%	89.3%	89.3%	89.3%	89.3%	89.3%	89.3%	89.3%
Analysis Period (min)	15	15	15	15	15	15	15	15	15	15
c Critical Lane Group										

HCM Signalized Intersection Capacity Analysis 2025 Baseline Conditions - AM Peak Hour  
16: Denny Way & Broad St 500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NER	SWL	SWR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Flt	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Flt Protected	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	3359	3359	3359	3359	3359	3359	3359	3359	3359	3359
Flt Permitted	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (perm)	3359	3359	3359	3359	3359	3359	3359	3359	3359	3359
Volume (vph)	0	1230	5	5	1080	5	0	320	40	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	1295	5	5	1137	5	0	337	42	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	10	0	0
Lane Group Flow (vph)	0	1300	0	0	1147	0	0	369	0	0
Conf. Peds. (#/hr)	22	22	22	22	22	22	22	22	22	22
Heavy Vehicles (%)	3%	3%	3%	4%	4%	4%	5%	5%	5%	5%
Bus Blockages (#/hr)	0	4	0	0	10	0	0	0	0	0
Turn Type	Protected Phases	1	1	1	1	1	1	1	1	1
Permitted Phases	Permitted Phases	53.0	53.0	53.0	53.0	53.0	53.0	53.0	53.0	53.0
Actuated Green, G (s)	55.0	55.0	55.0	55.0	55.0	55.0	55.0	55.0	55.0	55.0
Effective Green, g (s)	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55
Actuated g/C Ratio	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Clearance Time (s)	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55
Lane Grp Cap (vph)	1847	1847	1847	1847	1847	1847	1847	1847	1847	1847
v/s Ratio Prot	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39
v/s Ratio Perm	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay, d1	16.5	16.5	16.5	16.5	16.5	16.5	16.5	16.5	16.5	16.5
Progression Factor	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56
Incremental Delay, d2	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Delay (s)	9.8	9.8	9.8	9.8	9.8	9.8	9.8	9.8	9.8	9.8
Level of Service	A	A	A	A	A	A	A	A	A	A
Approach Delay (s)	9.8	9.8	9.8	9.8	9.8	9.8	9.8	9.8	9.8	9.8
Approach LOS	A	A	A	A	A	A	A	A	A	A
Intersection Summary										
HCM Average Control Delay	25.4	25.4	25.4	25.4	25.4	25.4	25.4	25.4	25.4	25.4
HCM Volume to Capacity ratio	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Actuated Cycle Length (s)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Intersection Capacity Utilization	73.6%	73.6%	73.6%	73.6%	73.6%	73.6%	73.6%	73.6%	73.6%	73.6%
Analysis Period (min)	15	15	15	15	15	15	15	15	15	15
c Critical Lane Group										

HCM Signalized Intersection Capacity Analysis 2025 Baseline Conditions - AM Peak Hour  
17: Denny Way & 5th Ave

Movement	EBL	EBT	EBR	EBR2	WBT	WBR	NBL	NBT	NBR	NBR2	SBL2	SBL
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	12	12	10	12	12	10	12	12	11	12
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Frpb, ped/bikes	0.99	0.99	0.99	0.99	0.99	0.99	0.99	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Flt Protected	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	3178	3178	3149	3149	2905	2905	2905	2905	2905	2905	1752	1752
Flt Permitted	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95
Satd. Flow (perm)	3025	3025	3149	3149	2905	2905	2905	2905	2905	2905	1752	1752
Volume (vph)	5	795	405	10	830	120	5	65	15	15	60	215
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	5	837	426	11	874	126	5	68	16	16	63	226
RTOR Reduction (vph)	0	0	0	0	9	0	0	15	0	0	0	0
Lane Group Flow (vph)	0	1279	0	0	991	0	0	90	0	0	0	289
Confl. Peds. (#/hr)	23	23	8	8	23	17	23	17	8	8	23	17
Heavy Vehicles (%)	2%	2%	2%	2%	4%	4%	8%	8%	8%	8%	3%	3%
Bus Blockages (#/hr)	0	4	0	0	2	0	0	11	0	0	0	0
Turn Type	Perm	Perm	Perm	Perm	Split	Split	Split	Split	Split	Split	Split	Split
Protected Phases	1	1	1	1	3	3	3	3	3	3	2	2
Permitted Phases	1	1	1	1	3	3	3	3	3	3	2	2
Actuated Green, G (s)	58.6	58.6	58.6	58.6	7.2	7.2	7.2	7.2	7.2	7.2	19.2	19.2
Effective Green, g (s)	60.6	60.6	60.6	60.6	9.2	9.2	9.2	9.2	9.2	9.2	21.2	21.2
Actuated g/C Ratio	0.61	0.61	0.61	0.61	0.09	0.09	0.09	0.09	0.09	0.09	0.21	0.21
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1833	1833	1908	1908	267	267	267	267	267	267	371	371
v/s Ratio Prot	c0.42	c0.42	0.31	0.31	c0.03	c0.03	c0.03	c0.03	c0.03	c0.03	c0.16	c0.16
v/s Ratio Perm	0.70	0.70	0.52	0.52	0.34	0.34	0.34	0.34	0.34	0.34	0.78	0.78
Uniform Delay, d1	13.4	13.4	11.3	11.3	42.5	42.5	42.5	42.5	42.5	42.5	37.2	37.2
Progression Factor	0.21	0.21	0.92	0.92	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.0	2.0	1.0	1.0	0.8	0.8	0.8	0.8	0.8	0.8	9.9	9.9
Delay (s)	4.8	4.8	11.4	11.4	43.3	43.3	43.3	43.3	43.3	43.3	47.1	47.1
Level of Service	A	A	B	B	D	D	D	D	D	D	D	D
Approach Delay (s)	4.8	4.8	11.4	11.4	43.3	43.3	43.3	43.3	43.3	43.3	47.1	47.1
Approach LOS	A	A	B	B	D	D	D	D	D	D	D	D
Intersection Summary												
HCM Average Control Delay	14.3											
HCM Volume to Capacity ratio	0.68											
Actuated Cycle Length (s)	100.0											
Intersection Capacity Utilization	67.8%											
Analysis Period (min)	15											
Critical Lane Group												

HCM Signalized Intersection Capacity Analysis 2025 Baseline Conditions - AM Peak Hour  
17: Denny Way & 5th Ave

Movement	SBT	SBR
Lane Configurations	1	1
Ideal Flow (vphpl)	1900	1900
Lane Width	13	12
Total Lost time (s)	3.0	3.0
Lane Util. Factor	1.00	1.00
Flpb, ped/bikes	0.99	0.99
Flpb, ped/bikes	1.00	1.00
Flt	0.98	0.98
Flt Protected	1.00	1.00
Satd. Flow (prot)	1860	1860
Flt Permitted	1.00	1.00
Satd. Flow (perm)	1860	1860
Volume (vph)	105	15
Peak-hour factor, PHF	0.95	0.95
Adj. Flow (vph)	111	16
RTOR Reduction (vph)	6	0
Lane Group Flow (vph)	121	0
Conf. Peds. (#/hr)	17	17
Heavy Vehicles (%)	3%	3%
Bus Blockages (#/hr)	0	0
Turn Type	Prot	Prot
Protected Phases	2	2
Permitted Phases	2	2
Actuated Green, G (s)	19.2	19.2
Effective Green, g (s)	21.2	21.2
Actuated g/C Ratio	0.21	0.21
Clearance Time (s)	5.0	5.0
Vehicle Extension (s)	3.0	3.0
Lane Grp Cap (vph)	394	394
v/s Ratio Prot	0.07	0.07
v/s Ratio Perm	0.31	0.31
Uniform Delay, d1	33.2	33.2
Progression Factor	1.00	1.00
Incremental Delay, d2	0.4	0.4
Delay (s)	33.7	33.7
Level of Service	C	C
Approach Delay (s)	43.0	43.0
Approach LOS	D	D
Intersection Summary		

Movement	EBT	EBR	EBR2	WBT	WBR	NBT	NBR	NBR2	SBL2	SBL	SBT	SBR
Lane Configurations	↑↓	↑↓		↑↓	↑↓	↑↓	↑↓		↑↓	↑↓	↑↓	↑↓
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	11	12	12	12	12	12	12	12	12
Total Lost time (s)	3.0			3.0		3.0			3.0		3.0	
Lane Util. Factor	0.95			0.95		0.95			1.00		0.95	
Flt	0.98			0.98		0.97			1.00		0.85	
Flt Protected	1.00			1.00		1.00			0.95		1.00	
Satd. Flow (prot)	3019			2955		3091			1577		1341	
Flt Permitted	1.00			1.00		1.00			0.95		1.00	
Satd. Flow (perm)	3019			2955		3091			1577		1341	
Volume (vph)	1025	150	5	950	160	325	75	5	385	185	0	895
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	1079	158	5	1000	168	342	79	5	405	195	0	942
RTOR Reduction (vph)	0	0	0	13	0	0	0	0	0	0	0	1
Lane Group Flow (vph)	1242	0	0	1153	0	426	0	0	600	479	478	0
Heavy Vehicles (%)	2%	2%	2%	4%	4%	2%	2%	2%	3%	3%	3%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	4	0
Turn Type	Protected Phases	2		2		4			Prot	Prot	Prot	Prot
Permitted Phases	Actuated Green, G (s)	28.3		28.3		17.7			3	3	8	8
Effective Green, g (s)	34.3			34.3		19.7			35.0	57.7	57.7	57.7
Actuated g/C Ratio	0.34			0.34		0.20			0.37	0.60	0.60	0.60
Clearance Time (s)	9.0			9.0		5.0			5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0			3.0		3.0			3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1036			1014		609			583	787	801	801
v/s Ratio Prot	c0.41			0.39		c0.14			c0.38	0.36	0.36	0.36
v/s Ratio Perm	1.20			1.14		0.70			1.03	0.61	0.60	0.60
Uniform Delay, d1	32.8			32.8		37.4			31.5	12.8	12.6	12.6
Progression Factor	1.13			0.62		1.00			1.00	1.00	1.00	1.00
Incremental Delay, d2	98.7			72.4		3.5			44.9	1.3	1.2	1.2
Delay (s)	136.0			92.7		40.9			76.4	14.1	13.8	13.8
Level of Service	F			F		D			E	B	B	B
Approach Delay (s)	136.0			92.7		40.9			38.0			
Approach LOS	F			F		D			D			
Intersection Summary												
HCM Average Control Delay	80.5 HCM Level of Service											
HCM Volume to Capacity ratio	1.02											
Actuated Cycle Length (s)	100.0 Sum of lost time (s)											
Intersection Capacity Utilization	94.9% ICU Level of Service											
Analysis Period (min)	15											
Critical Lane Group												

Movement	SBR2
Lane Configurations	1900
Ideal Flow (vphpl)	12
Lane Width	
Total Lost time (s)	
Lane Util. Factor	
Flt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Volume (vph)	15
Peak-hour factor, PHF	0.95
Adj. Flow (vph)	16
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Heavy Vehicles (%)	3%
Bus Blockages (#/hr)	0
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	
Intersection Summary	

HCM Signalized Intersection Capacity Analysis 2025 Baseline Conditions - AM Peak Hour  
19: Denny Way & Dexter Avenue 500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4T	1T	1T	1T	1T	1T	1T	1T	1T	1T	1T	1T
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Fit Protected	1.00	0.99	0.99	1.00	0.99	0.99	1.00	0.99	0.99	1.00	0.95	1.00
Satd. Flow (prot)	3205	3146	3146	3146	3146	3146	3146	3146	3146	3146	3146	3146
Fit Permitted	0.71	1.00	0.99	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Satd. Flow (perm)	2294	3146	3146	3146	3146	3146	3146	3146	3146	3146	3146	3146
Volume (vph)	90	1310	5	0	900	80	5	100	5	165	320	235
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	98	1424	5	0	978	87	5	109	5	179	348	255
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	1527	0	0	1080	0	5	110	0	179	348	63
Heavy Vehicles (%)	1%	1%	1%	2%	2%	2%	20%	20%	20%	2%	2%	2%
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	2	5	1	3	3	3	3	3	3	3	3	3
Permitted Phases	5	3	3	3	3	3	3	3	3	3	3	3
Actuated Green, G (s)	66.3	43.3	21.7	21.7	21.7	21.7	21.7	21.7	21.7	21.7	21.7	21.7
Effective Green, g (s)	89.3	51.3	24.7	24.7	24.7	24.7	24.7	24.7	24.7	24.7	24.7	24.7
Actuated g/C Ratio	0.69	0.51	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1726	1614	148	664	148	664	282	787	352	0.11	0.04	0.04
v/s Ratio Prot	c0.13	0.34	0.01	0.04	0.01	0.04	c0.16	0.11	0.04	0.16	0.11	0.04
v/s Ratio Perm	c0.48	0.66	0.03	0.17	0.03	0.17	0.63	0.44	0.18	0.63	0.44	0.18
Uniform Delay, d1	12.2	17.9	28.6	29.6	28.6	29.6	33.6	31.8	29.7	33.6	31.8	29.7
Progression Factor	0.64	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.6	2.1	0.1	0.1	0.1	0.1	4.6	0.4	0.2	4.6	0.4	0.2
Delay (s)	8.4	20.0	28.7	29.7	28.7	29.7	38.2	32.2	29.9	38.2	32.2	29.9
Level of Service	A	B	C	C	C	C	D	C	C	D	C	C
Approach Delay (s)	8.4	20.0	29.6	29.6	29.6	29.6	32.8	32.8	29.6	32.8	32.8	29.6
Approach LOS	A	B	C	C	C	C	D	C	C	D	C	C
Intersection Summary												
HCM Average Control Delay	18.1											
HCM Volume to Capacity ratio	0.81											
Actuated Cycle Length (s)	100.0											
Intersection Capacity Utilization	100.6%											
Analysis Period (min)	15											
Critical Lane Group	C											

HCM Signalized Intersection Capacity Analysis 2025 Baseline Conditions - AM Peak Hour  
20: Denny Way & Westlake Ave 500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4T	1T	1T	1T	1T	1T	1T	1T	1T	1T	1T	1T
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Fit Protected	1.00	0.99	0.99	1.00	0.99	0.99	1.00	0.99	0.99	1.00	0.95	1.00
Satd. Flow (prot)	3059	2956	2956	2956	2956	2956	2956	2956	2956	2956	2956	2956
Fit Permitted	0.71	1.00	0.99	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Satd. Flow (perm)	3059	2956	2956	2956	2956	2956	2956	2956	2956	2956	2956	2956
Volume (vph)	0	1455	65	0	940	155	5	335	95	130	150	15
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	1516	68	0	979	161	5	349	99	135	156	16
RTOR Reduction (vph)	0	3	0	0	13	0	0	25	0	0	7	0
Lane Group Flow (vph)	0	1531	0	0	1127	0	0	428	0	135	165	0
Heavy Vehicles (%)	2%	2%	2%	4%	4%	4%	7%	7%	7%	0%	0%	0%
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	1	1	1	1	1	1	1	1	1	1	1	1
Permitted Phases	1	1	1	1	1	1	1	1	1	1	1	1
Actuated Green, G (s)	59.0	59.0	59.0	59.0	59.0	59.0	59.0	59.0	59.0	59.0	59.0	59.0
Effective Green, g (s)	61.0	61.0	61.0	61.0	61.0	61.0	61.0	61.0	61.0	61.0	61.0	61.0
Actuated g/C Ratio	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1866	1803	1803	1803	1803	1803	1803	1803	1803	1803	1803	1803
v/s Ratio Prot	c0.52	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38
v/s Ratio Perm	0.85	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62
Uniform Delay, d1	15.7	12.3	12.3	12.3	12.3	12.3	12.3	12.3	12.3	12.3	12.3	12.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	5.0	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
Delay (s)	20.7	13.9	13.9	13.9	13.9	13.9	13.9	13.9	13.9	13.9	13.9	13.9
Level of Service	C	B	B	B	B	B	B	B	B	B	B	B
Approach Delay (s)	20.7	13.9	13.9	13.9	13.9	13.9	13.9	13.9	13.9	13.9	13.9	13.9
Approach LOS	C	B	B	B	B	B	B	B	B	B	B	B
Intersection Summary												
HCM Average Control Delay	21.0											
HCM Volume to Capacity ratio	0.77											
Actuated Cycle Length (s)	100.0											
Intersection Capacity Utilization	78.8%											
Analysis Period (min)	15											
Critical Lane Group	C											



HCM Signalized Intersection Capacity Analysis 2025 Baseline Conditions - AM Peak Hour  
21: Denny Way & Fairview Ave 500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	11	11	12	11	11	12	9	10	12	10	10	12
Lane Width	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Total Lost time (s)	1.00	0.95	1.00	0.95	1.00	0.95	0.97	0.95	1.00	0.95	1.00	0.95
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.98	1.00	0.95	1.00	0.95
Fit Protected	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	0.95	1.00	0.95
Fit Permitted	1555	3099	1540	2999	1540	2999	2781	2901	1458	2771	1458	2771
Satd. Flow (perm)	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Volume (vph)	165	830	20	45	855	180	360	335	65	115	365	180
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	176	883	21	48	910	191	383	356	69	122	388	191
RTOR Reduction (vph)	0	1	0	0	17	0	0	17	0	0	63	0
Lane Group Flow (vph)	176	903	0	48	1084	0	383	408	0	122	516	0
Heavy Vehicles (%)	1%	1%	1%	2%	2%	2%	2%	2%	2%	4%	4%	4%
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	1	6	5	2	3	8	7	4				
Permitted Phases												
Actuated Green, G (s)	12.3	38.1	5.3	31.1	14.8	27.6	9.0	21.8				
Effective Green, g (s)	14.3	40.1	7.3	33.1	16.8	29.6	11.0	23.8				
Actuated g/C Ratio	0.14	0.40	0.07	0.33	0.17	0.30	0.11	0.24				
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0				
Lane Grp Cap (vph)	222	1243	112	993	467	859	160	659				
v/s Ratio Prot	c0.11	0.29	0.03	c0.36	c0.14	0.14	0.08	c0.19				
v/s Ratio Perm												
v/c Ratio	0.79	0.73	0.43	1.09	0.82	0.48	0.76	0.78				
Uniform Delay, d1	41.4	25.3	44.4	33.4	40.1	28.8	43.2	35.7				
Progression Factor	1.00	1.00	1.14	0.96	1.00	1.00	1.09	0.79				
Incremental Delay, d2	17.4	3.7	1.6	51.6	11.0	0.4	17.8	5.6				
Delay (s)	58.8	29.0	52.3	83.7	51.2	29.3	64.9	33.8				
Level of Service	E	C	D	F	D	C	E	C				
Approach Delay (s)	33.9	82.4	F	F	39.6	D	38.3	D				
Approach LOS	C	F	F	F	D	D	D	D				
Intersection Summary												
HCM Average Control Delay	51.1											
HCM Volume to Capacity ratio	0.91											
Actuated Cycle Length (s)	100.0											
Intersection Capacity Utilization	85.2%											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis 2025 Baseline Conditions - AM Peak Hour  
22: Denny Way & Stewart St 500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	11	11	12	11	11	12	9	10	12	10	10	12
Lane Width	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Total Lost time (s)	1.00	0.95	1.00	0.95	1.00	0.95	0.97	0.95	1.00	0.95	1.00	0.95
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.98	1.00	0.95	1.00	0.95
Fit Protected	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	0.95	1.00	0.95
Fit Permitted	2963	1000	1593	1676	1593	1676	1593	1676	1593	1676	1593	1676
Satd. Flow (perm)	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Volume (vph)	0	535	280	805	1005	0	0	0	0	0	205	185
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	557	292	830	1047	0	0	0	0	0	214	193
RTOR Reduction (vph)	0	26	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	823	0	830	1047	0	0	0	0	0	2635	0
Heavy Vehicles (%)	4%	4%	4%	2%	2%	2%	2%	2%	2%	0%	5%	5%
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	3	2	2	3	1							
Permitted Phases												
Actuated Green, G (s)	20.5	29.5	54.5	36.5								
Effective Green, g (s)	22.0	31.0	56.0	38.0								
Actuated g/C Ratio	0.22	0.31	0.56	0.38								
Clearance Time (s)	4.5	4.5	4.5	4.5								
Vehicle Extension (s)	3.0	3.0	3.0	3.0								
Lane Grp Cap (vph)	652	494	939	2097								
v/s Ratio Prot	c0.28	c0.40	0.62	c0.48								
v/s Ratio Perm												
v/c Ratio	1.26	1.28	1.12	1.26								
Uniform Delay, d1	39.0	34.5	22.0	31.0								
Progression Factor	0.98	1.00	1.00	0.86								
Incremental Delay, d2	129.6	138.9	66.3	119.1								
Delay (s)	167.6	173.4	88.3	145.9								
Level of Service	F	F	F	F								
Approach Delay (s)	167.6	120.3	0.0	145.9								
Approach LOS	F	F	A	F								
Intersection Summary												
HCM Average Control Delay	141.1											
HCM Volume to Capacity ratio	1.26											
Actuated Cycle Length (s)	100.0											
Intersection Capacity Utilization	115.2%											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis 2025 Baseline Conditions - AM Peak Hour  
23: Yale St & Stewart St 500 Fifth Avenue North

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Total Lost time (s)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Util. Factor	1.00	0.85	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fit	1.00	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fit Protected	1660	1411	1624	1710	1552	1449	1552	1449	1552	1449	1552	1449
Satd. Flow (prot)	1.00	1.00	0.37	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fit Permitted	1660	1411	632	1710	1552	1449	1552	1449	1552	1449	1552	1449
Satd. Flow (perm)	0.230	0.35	10	0.230	0.35	10	0.230	0.35	10	0.230	0.35	10
Volume (vph)	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	0.235	0.51	36	0.235	0.51	36	0.235	0.51	36	0.235	0.51	36
RTOR Reduction (vph)	0	0	13	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0.235	0.38	36	0.235	0.38	36	0.235	0.38	36	0.235	0.38	36
Heavy Vehicles (%)	3%	3%	3%	0%	0%	0%	0%	0%	0%	0%	4%	4%
Turn Type	3	Perm	Perm	3	Perm	Perm	3	Perm	Perm	3	Perm	Perm
Protected Phases	3	3	3	3	3	3	3	3	3	3	3	3
Permitted Phases	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5
Actuated Green, G (s)	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0
Effective Green, g (s)	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22
Actuated g/C Ratio	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Clearance Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Vehicle Extension (s)	365	310	139	376	310	139	376	310	139	376	310	139
Lane Grp Cap (vph)	c0.14	0.03	0.06	0.03	0.06	0.03	0.06	0.03	0.06	0.03	0.06	0.03
v/s Ratio Prot	0.64	0.12	0.26	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
v/s Ratio Perm	35.4	31.3	32.3	30.6	30.6	30.6	30.6	30.6	30.6	30.6	30.6	30.6
Uniform Delay, d1	0.98	1.10	0.34	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30
Progression Factor	3.3	0.1	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Incremental Delay, d2	38.2	34.6	11.8	9.1	9.1	9.1	9.1	9.1	9.1	9.1	9.1	9.1
Delay (s)	D	C	B	A	A	A	A	A	A	A	A	A
Level of Service	37.5	D	B	11.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Approach Delay (s)	D	D	B	B	B	B	B	B	B	B	B	B
Approach LOS	D	D	B	B	B	B	B	B	B	B	B	B
Intersection Summary	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1
HCM Average Control Delay	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1
HCM Volume to Capacity ratio	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67
Actuated Cycle Length (s)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Intersection Capacity Utilization	72.7%	72.7%	72.7%	72.7%	72.7%	72.7%	72.7%	72.7%	72.7%	72.7%	72.7%	72.7%
Analysis Period (min)	15	15	15	15	15	15	15	15	15	15	15	15
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis 2025 Baseline Conditions - AM Peak Hour  
24: Yale St & Howell St 500 Fifth Avenue North

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Total Lost time (s)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Util. Factor	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fit	1.00	1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fit Protected	1593	1334	1593	1334	1593	1334	1593	1334	1593	1334	1593	1334
Satd. Flow (prot)	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Fit Permitted	1593	1334	1593	1334	1593	1334	1593	1334	1593	1334	1593	1334
Satd. Flow (perm)	0.230	0.35	10	0.230	0.35	10	0.230	0.35	10	0.230	0.35	10
Volume (vph)	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	0.235	0.51	36	0.235	0.51	36	0.235	0.51	36	0.235	0.51	36
RTOR Reduction (vph)	0	0	13	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0.235	0.38	36	0.235	0.38	36	0.235	0.38	36	0.235	0.38	36
Heavy Vehicles (%)	3%	3%	3%	0%	0%	0%	0%	0%	0%	0%	4%	4%
Turn Type	3	Perm	Perm	3	Perm	Perm	3	Perm	Perm	3	Perm	Perm
Protected Phases	3	3	3	3	3	3	3	3	3	3	3	3
Permitted Phases	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5
Actuated Green, G (s)	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0
Effective Green, g (s)	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22
Actuated g/C Ratio	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Clearance Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Vehicle Extension (s)	365	310	139	376	310	139	376	310	139	376	310	139
Lane Grp Cap (vph)	c0.14	0.03	0.06	0.03	0.06	0.03	0.06	0.03	0.06	0.03	0.06	0.03
v/s Ratio Prot	0.64	0.12	0.26	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
v/s Ratio Perm	35.4	31.3	32.3	30.6	30.6	30.6	30.6	30.6	30.6	30.6	30.6	30.6
Uniform Delay, d1	0.98	1.10	0.34	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30
Progression Factor	3.3	0.1	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Incremental Delay, d2	38.2	34.6	11.8	9.1	9.1	9.1	9.1	9.1	9.1	9.1	9.1	9.1
Delay (s)	D	C	B	A	A	A	A	A	A	A	A	A
Level of Service	37.5	D	B	11.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Approach Delay (s)	D	D	B	B	B	B	B	B	B	B	B	B
Approach LOS	D	D	B	B	B	B	B	B	B	B	B	B
Intersection Summary	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1
HCM Average Control Delay	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1
HCM Volume to Capacity ratio	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67
Actuated Cycle Length (s)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Intersection Capacity Utilization	72.7%	72.7%	72.7%	72.7%	72.7%	72.7%	72.7%	72.7%	72.7%	72.7%	72.7%	72.7%
Analysis Period (min)	15	15	15	15	15	15	15	15	15	15	15	15
c Critical Lane Group												



HCM Signalized Intersection Capacity Analysis 2025 Baseline Conditions - PM Peak Hour  
1: Roy St & 5th Ave 500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	11	12	11	11	12	11	11	12
Total Lost time (s)				3.0			3.0			3.0		
Lane Util. Factor				1.00			0.95			1.00		
Frpb, ped/bikes				1.00			1.00			0.99		
Flpb, ped/bikes				0.99			1.00			1.00		
Flt				0.99			1.00			0.96		
Flt Protected				0.98			0.95			0.99		
Satd. Flow (prot)				1381			1641			1646		
Flt Permitted				0.98			0.95			1.00		
Satd. Flow (perm)				1381			1641			1646		
Volume (vph)	0	0	0	40	60	5	640	345	50	10	200	70
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	43	65	5	696	375	54	11	217	76
RTOR Reduction (vph)	0	0	0	0	2	0	0	5	0	0	15	0
Lane Group Flow (vph)	0	0	0	0	111	20	596	524	0	11	278	0
Confl. Peds. (#/hr)				20			20			20		
Heavy Vehicles (%)				0%			2%			1%		
Parking (#/hr)				20			20			8		
Turn Type				Perm			Split			Split		
Protected Phases				6			4			8		
Permitted Phases				6								
Actuated Green, G (s)				17.0			27.0			18.0		
Effective Green, g (s)				20.0			30.0			21.0		
Actuated g/C Ratio				0.25			0.38			0.26		
Clearance Time (s)				6.0			6.0			6.0		
Lane Grp Cap (vph)				345			615			432		
v/s Ratio Prot				0.08			0.36			0.01		
v/s Ratio Perm				0.32			0.97			0.03		
Uniform Delay, d1				24.5			24.5			21.9		
Progression Factor				1.00			0.20			1.00		
Incremental Delay, d2				2.4			15.5			0.1		
Delay (s)				26.9			20.4			22.0		
Level of Service				C			C			C		
Approach Delay (s)				0.0			21.3			39.2		
Approach LOS				A			C			D		
Intersection Summary												
HCM Average Control Delay				25.2			HCM Level of Service			C		
HCM Volume to Capacity ratio				0.72								
Actuated Cycle Length (s)				80.0						9.0		
Intersection Capacity Utilization				64.5%			ICU Level of Service			C		
Analysis Period (min)				15								
Critical Lane Group												

HCM Signalized Intersection Capacity Analysis 2025 Baseline Conditions - PM Peak Hour  
2: Broad St & 9th Ave 500 Fifth Avenue North

Movement	EBT	EBR	WBL	WBT	WBR	SBL	SBT	SBR	SBR2
Lane Configurations	4T		4T	4T		4T	4T	4	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	10	10	11	12	9	8	12
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Util. Factor	0.95	1.00	0.95	1.00	0.95	1.00	0.91	1.00	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Flt	0.93	1.00	0.99	1.00	0.99	1.00	1.00	0.85	
Flt Protected	1.00	0.95	1.00	1.00	0.99	1.00	0.99	1.00	
Satd. Flow (prot)	2930	1516	2996			3847	1247		
Flt Permitted	1.00	0.23	1.00			0.99	1.00		
Satd. Flow (perm)	2930	368	2996			3847	1247		
Volume (vph)	365	295	190	1675	145	155	1035	225	5
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	376	304	196	1727	149	160	1067	232	5
RTOR Reduction (vph)	121	0	0	0	0	0	0	1	0
Lane Group Flow (vph)	559	0	196	1876	0	0	1227	236	0
Confl. Peds. (#/hr)		50				50			
Heavy Vehicles (%)	0%	0%	0%	0%	0%	1%	1%	1%	1%
Bus Blockages (#/hr)	0	0	0	0	0	0	2	0	0
Parking (#/hr)							20		
Turn Type	1	2	1	2	3	3	3	3	
Protected Phases	12								
Permitted Phases	37.5	62.5	68.5			39.5	39.5		
Actuated Green, G (s)	40.5	68.5	71.5			42.5	42.5		
Effective Green, g (s)	0.34	0.57	0.60			0.35	0.35		
Actuated g/C Ratio	6.0	6.0	6.0			6.0	6.0		
Clearance Time (s)	3.0	3.0	3.0			3.0	3.0		
Vehicle Extension (s)									
Lane Grp Cap (vph)	989	478	1785			1362	442		
v/s Ratio Prot	0.19	0.10	c0.63			c0.32	0.19		
v/c Ratio Perm	0.14								
v/c Ratio	0.57	0.41	1.05			0.90	0.53		
Uniform Delay, d1	32.5	26.4	24.2			36.8	30.9		
Progression Factor	1.00	0.31	0.26			1.00	1.00		
Incremental Delay, d2	2.3	0.1	24.7			8.5	12		
Delay (s)	34.9	8.1	31.0			45.2	32.1		
Level of Service	C	A	C			D	C		
Approach Delay (s)	34.9	28.9	43.1			43.1			
Approach LOS	C	C	C			D			
Intersection Summary									
HCM Average Control Delay	34.8			HCM Level of Service			C		
HCM Volume to Capacity ratio	0.99								
Actuated Cycle Length (s)	120.0			Sum of lost time (s)			6.0		
Intersection Capacity Utilization	89.0%			ICU Level of Service			E		
Analysis Period (min)	15								
c Critical Lane Group									

HCM Signalized Intersection Capacity Analysis 2025 Baseline Conditions - PM Peak Hour  
3: Broad St & Westlake Ave 500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	GBR
Lane Configurations	4T	1T	1T	4T	1T	1T	4T	1T	1T	4T	1T	1T
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	12	12	10	12	12	10	12	12	12	12
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00
Frpb, ped/bikes	0.98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	0.96	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt	0.97	1.00	1.00	1.00	0.85	1.00	0.94	1.00	1.00	1.00	1.00	1.00
Flt Protected	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	2962	1624	3032	1454	1549	2820	1624	1710	1624	1710	1624	1710
Flt Permitted	0.75	0.40	1.00	1.00	0.36	1.00	0.10	1.00	0.10	1.00	0.10	1.00
Satd. Flow (perm)	2231	684	3032	1454	582	2820	167	1710	167	1710	167	1710
Volume (vph)	15	435	90	110	1890	1130	185	715	485	50	315	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	16	458	95	116	1989	1189	195	753	511	53	332	0
RTOR Reduction (vph)	0	14	0	0	0	22	0	99	0	0	0	0
Lane Group Flow (vph)	0	555	0	116	1989	1167	195	1165	0	53	332	0
Confl. Peds. (#/hr)												
Heavy Vehicles (%)	1%	1%	1%	0%	0%	0%	1%	1%	1%	0%	0%	0%
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	2			2			1				1	
Permitted Phases	2			2			1				1	
Actuated Green, G (s)	70.5	70.5	70.5	70.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5
Effective Green, g (s)	73.0	73.0	73.0	73.0	41.0	41.0	41.0	41.0	41.0	41.0	41.0	41.0
Actuated g/C Ratio	0.61	0.61	0.61	0.61	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34
Clearance Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1357	416	1844	865	199	964	57	584	57	584	57	584
v/s Ratio Prot												
v/s Ratio Perm	0.25	0.17	0.66	0.60	0.33	0.33	0.32	0.32	0.32	0.32	0.32	0.32
v/c Ratio	0.41	0.28	1.03	1.32	0.98	1.21	0.93	0.93	0.93	0.93	0.93	0.93
Uniform Delay, d1	12.3	11.1	23.5	23.5	39.1	39.5	38.1	32.3	38.1	32.3	38.1	32.3
Progression Factor	0.60	0.86	0.71	0.70	0.54	0.46	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.2	0.2	42.7	148.6	15.0	94.6	100.2	4.0	100.2	4.0	100.2	4.0
Delay (s)	7.5	9.7	59.4	165.0	36.0	112.8	138.4	36.3	138.4	36.3	138.4	36.3
Level of Service	A	A	E	F	D	F	F	D	F	D	F	D
Approach Delay (s)	7.5		95.8			102.5					50.3	
Approach LOS	A		F			F					D	
Intersection Summary												
HCM Average Control Delay												
HCM Volume to Capacity ratio												
Actuated Cycle Length (s)												
Intersection Capacity Utilization												
Analysis Period (min)												
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis 2025 Baseline Conditions - PM Peak Hour  
4: Valley St & Fairview Ave 500 Fifth Avenue North

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	4T	1T	1T	4T	1T	1T
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	10	12	12	12	12	12
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	1.00	1.00	0.95	0.94	1.00
Frpb	1.00	0.85	1.00	1.00	1.00	0.85
Flpb	1.00	1.00	0.95	1.00	0.95	1.00
Flt Protected	3002	1151	812	3217	4536	1439
Flt Permitted	1.00	1.00	0.17	1.00	0.95	1.00
Satd. Flow (perm)	3002	1151	148	3217	4536	1439
Volume (vph)	790	55	5	990	2015	390
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	806	56	5	1010	2056	398
RTOR Reduction (vph)	0	12	0	0	0	20
Lane Group Flow (vph)	806	44	5	1010	2056	378
Heavy Vehicles (%)	1%	1%	100%	1%	1%	1%
Parking (#/hr)						
Turn Type	Perm	Perm	D.P+P	Perm	D.P+P	Perm
Protected Phases	4	3	3	4	2	2
Permitted Phases	4	3	3	4	2	2
Actuated Green, G (s)	40.0	40.0	49.0	54.0	56.0	70.0
Effective Green, g (s)	42.0	42.0	53.0	56.0	58.0	72.0
Actuated g/C Ratio	0.35	0.35	0.44	0.47	0.48	0.60
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1051	403	126	1501	2192	863
v/s Ratio Prot	c0.27	0.00	c0.31	c0.45	0.26	
v/s Ratio Perm						
v/c Ratio	0.77	0.11	0.04	0.67	0.94	0.44
Uniform Delay, d1	34.7	26.4	20.7	24.9	29.3	13.0
Progression Factor	1.24	1.41	1.00	1.00	1.01	1.02
Incremental Delay, d2	3.7	0.4	0.1	1.2	1.1	0.0
Delay (s)	46.6	37.5	20.8	26.1	30.8	13.3
Level of Service	D	D	C	C	C	B
Approach Delay (s)	46.0			26.1	28.0	
Approach LOS	D			C	C	
Intersection Summary						
HCM Average Control Delay						
HCM Volume to Capacity ratio						
Actuated Cycle Length (s)						
Intersection Capacity Utilization						
Analysis Period (min)						
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis 2025 Baseline Conditions - PM Peak Hour  
5: Mercer St & 1st Avenue

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4↑	4↑					4↑	4↑				
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0					3.0	3.0				
Lane Util. Factor	0.95	0.95					1.00	0.93				
Flt	1.00	1.00					0.95	1.00				
Flt Protected	3525	3525					1736	3242				
Satd. Flow (prot)	1.00	1.00					0.95	1.00				
Flt Permitted	1.00	1.00					0.95	1.00				
Satd. Flow (perm)	3525	3525					1736	3242				
Volume (vph)	105	1195	0	0	0	0	160	445	350	0	0	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	111	1258	0	0	0	0	168	468	368	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	15	0	0	0	0
Lane Group Flow (vph)	0	1369	0	0	0	0	168	821	0	0	0	0
Heavy Vehicles (%)	2%	2%	2%	0%	0%	0%	4%	4%	4%	0%	0%	0%
Turn Type	Perm	Perm					Perm	Perm				
Protected Phases	1							2				
Permitted Phases	1							2				
Actuated Green, G (s)	36.0							36.0				
Effective Green, g (s)	37.0							37.0				
Actuated g/C Ratio	0.46							0.46				
Clearance Time (s)	4.0							4.0				
Lane Grp Cap (vph)	1630							803	1499			
v/s Ratio Prot								c0.25				
v/s Ratio Perm	0.39							0.10				
v/c Ratio	0.84							0.21	0.55			
Uniform Delay, d1	18.9							12.8	15.5			
Progression Factor	1.00							1.00	1.00			
Incremental Delay, d2	5.4							0.6	1.4			
Delay (s)	24.3							13.4	16.9			
Level of Service	C							B	B			
Approach Delay (s)	24.3							0.0	16.3			0.0
Approach LOS	C							A	B			A
Intersection Summary												
HCM Average Control Delay	20.9								HCM Level of Service			C
HCM Volume to Capacity ratio	0.69											
Actuated Cycle Length (s)	80.0								Sum of lost time (s)			6.0
Intersection Capacity Utilization	66.3%								ICU Level of Service			C
Analysis Period (min)	15											
Critical Lane Group												

HCM Signalized Intersection Capacity Analysis 2025 Baseline Conditions - PM Peak Hour  
6: Mercer St & 5th Ave

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4↑	4↑					4↑	4↑				
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	11	12	12	12	12	11	11	11	11	12
Total Lost time (s)	3.0	3.0					3.0	3.0	3.0	3.0	3.0	
Lane Util. Factor	0.86	1.00					0.91	0.91	0.91	0.91	0.91	
Flt, ped/bikes	1.00	0.92					1.00	0.95	1.00	1.00	1.00	
Flt, ped/bikes	1.00	1.00					1.00	1.00	1.00	1.00	1.00	
Flt	1.00	0.85					1.00	0.85	1.00	1.00	1.00	
Flt Protected	1.00	1.00					1.00	1.00	0.95	0.99		
Satd. Flow (prot)	5874	1421					3190	1335	1527	2842		
Flt Permitted	1.00	1.00					1.00	1.00	0.12	0.67		
Satd. Flow (perm)	5874	1421					3190	1335	201	1943		
Volume (vph)	65	1345	175	0	0	0	0	1020	365	125	160	0
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	69	1431	186	0	0	0	0	1085	388	133	170	0
RTOR Reduction (vph)	0	0	58	0	0	0	0	0	165	0	0	0
Lane Group Flow (vph)	0	1500	128	0	0	0	0	1085	223	67	236	0
Conf. Peds. (#/hr)	30		35	35			30	95	25	25	95	
Heavy Vehicles (%)	1%	1%	1%	0%	0%	0%	1%	1%	1%	4%	4%	4%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	18	0
Parking (#/hr)	25	25									8	
Turn Type	Perm	Perm	Perm					Perm	Perm	pm+pt		
Protected Phases	2							8		7	4	
Permitted Phases	2							8		4		
Actuated Green, G (s)	22.0		22.0					25.0	26.0	46.0	46.0	
Effective Green, g (s)	25.0		25.0					29.0	29.0	49.0	49.0	
Actuated g/C Ratio	0.31		0.31					0.36	0.36	0.61	0.61	
Clearance Time (s)	6.0		6.0					6.0	6.0	6.0	6.0	
Lane Grp Cap (vph)	1836		444					1156	484	405	1381	
v/s Ratio Prot								c0.34	0.04	c0.04		
v/s Ratio Perm	0.26		0.09					0.94	0.17	0.07	0.07	
v/c Ratio	0.82		0.29					0.94	0.46	0.17	0.17	
Uniform Delay, d1	25.4		20.8					24.6	19.5	19.7	6.7	
Progression Factor	0.71		0.45					0.82	0.85	2.53	2.83	
Incremental Delay, d2	2.7		1.1					14.2	2.8	0.7	0.2	
Delay (s)	20.9		10.4					34.4	19.4	50.7	19.2	
Level of Service	C		B					C	B	D	B	
Approach Delay (s)	19.7							0.0	30.4		26.2	
Approach LOS	B							A	C		C	
Intersection Summary												
HCM Average Control Delay	24.8								HCM Level of Service			C
HCM Volume to Capacity ratio	0.69											
Actuated Cycle Length (s)	80.0								Sum of lost time (s)			6.0
Intersection Capacity Utilization	77.0%								ICU Level of Service			D
Analysis Period (min)	15											
Critical Lane Group												

HCM Signalized Intersection Capacity Analysis 2025 Baseline Conditions - PM Peak Hour  
7: Mercer St & Dexter Avenue 500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBR	NBY	NBR	SBL	SBT	NEL	NER	NER2
Lane Configurations	4T1P	1P1P	1P1P	1P1P	1P1P	1P1P	1P1P	1P1P	1P1P	1P1P	1P1P
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	10	11	10	12	12	12	12
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.86	1.00	0.86	1.00	0.85	1.00	0.85	1.00	0.87	0.85	0.85
Frft	0.99	1.00	0.86	1.00	1.00	0.95	1.00	0.95	1.00	0.99	1.00
Flt Protected	5760	1479	3032	1405	1501	3217	1480	1381			
Satd. Flow (prot)	0.99	1.00	1.00	1.00	1.00	0.13	1.00	0.99	1.00		
Flt Permitted	5760	1479	3032	1405	201	3217	1480	1381			
Satd. Flow (perm)	275	1645	55	110	515	175	310	475	30	345	10
Volume (vph)	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Peak-hour factor, PHF	309	1848	62	124	579	197	348	534	34	388	11
Adj. Flow (vph)	0	0	0	65	0	9	0	0	0	2	0
RTOR Reduction (vph)	0	2219	0	59	579	188	348	534	233	198	0
Lane Group Flow (vph)	1%	1%	1%	0%	0%	0%	1%	1%	0%	0%	0%
Heavy Vehicles (%)	Perm	1	1	1	1	1	1	1	1	1	1
Turn Type	Protected Phases	1	1	1	1	1	1	1	1	1	1
Protected Phases	Permitted Phases	1	1	1	1	1	1	1	1	1	1
Actuated Green, G (s)	64.0	64.0	26.0	26.0	44.0	44.0	44.0	44.0	14.0	14.0	14.0
Effective Green, g (s)	67.0	67.0	29.0	29.0	47.0	47.0	47.0	47.0	17.0	17.0	17.0
Actuated g/C Ratio	0.48	0.48	0.21	0.21	0.34	0.34	0.34	0.34	0.12	0.12	0.12
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lane Grp Cap (vph)	2757	708	628	291	207	1080	180	168			
v/s Ratio Prot	0.04	0.19			c0.18	0.17	c0.16	0.14			
v/c Ratio	0.39	0.80	0.92	0.65	1.68	0.49	1.29	1.18			
Uniform Delay, d1	31.0	19.8	54.4	50.8	39.2	37.0	61.5	61.5			
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Incremental Delay, d2	2.6	0.2	21.1	10.6	326.7	1.6	167.3	128.1			
Delay (s)	33.6	20.1	75.5	61.4	365.8	38.7	228.8	187.6			
Level of Service	C	C	E	E	F	D	F	F			
Approach Delay (s)	33.6		72.0		167.7	209.8					
Approach LOS	C		E		F	F					
Intersection Summary											
HCM Average Control Delay	83.8										
HCM Volume to Capacity ratio	1.18										
Actuated Cycle Length (s)	140.0										
Intersection Capacity Utilization	96.7%										
Analysis Period (min)	15										
c Critical Lane Group											

HCM Signalized Intersection Capacity Analysis 2025 Baseline Conditions - PM Peak Hour  
8: Mercer St & 9th Ave 500 Fifth Avenue North

Movement	EBT	EBR	SBL	SBT	SBR	SER
Lane Configurations	1P1P	1P1P	1P1P	1P1P	1P1P	1P1P
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	9	12	11
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.86	0.91	0.91	0.91	0.91	0.91
Frft, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Flt, ped/bikes	1.00	0.88	0.94			
Flt Protected	1.00	1.00	0.98			
Satd. Flow (prot)	5614	1288	2505			
Flt Permitted	1.00	0.95	0.98			
Satd. Flow (perm)	5614	1288	2505			
Volume (vph)	2140	40	705	315	90	0
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	2184	41	719	321	92	0
RTOR Reduction (vph)	2	0	4	4	0	0
Lane Group Flow (vph)	2223	0	365	759	0	0
Conf. Peds. (#/hr)			50			
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%
Bus Blockages (#/hr)	0	0	0	2	0	0
Turn Type	Perm	Perm	Perm	custom	custom	custom
Protected Phases	1		2			
Permitted Phases						
Actuated Green, G (s)	70.4	38.6	38.6			
Effective Green, g (s)	72.9	41.1	41.1			
Actuated g/C Ratio	0.61	0.34	0.34			
Clearance Time (s)	5.5	5.5	5.5			
Vehicle Extension (s)	3.0	3.0	3.0			
Lane Grp Cap (vph)	3411	441	858			
v/s Ratio Prot	c0.40					
v/c Ratio Perm		0.28	0.30			
v/c Ratio	0.65	0.83	0.88			
Uniform Delay, d1	15.3	36.2	37.2			
Progression Factor	1.00	1.44	1.43			
Incremental Delay, d2	1.0	7.6	6.9			
Delay (s)	16.3	59.7	60.1			
Level of Service	B	E	E			
Approach Delay (s)	16.3		60.0			
Approach LOS	B	E	E			
Intersection Summary						
HCM Average Control Delay	31.0					
HCM Volume to Capacity ratio	0.74					
Actuated Cycle Length (s)	120.0					
Intersection Capacity Utilization	65.6%					
Analysis Period (min)	15					
i Phase conflict between lane groups						
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis 2025 Baseline Conditions - PM Peak Hour  
9: Mercer St & Westlake Ave 500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR	SBR
Lane Configurations	4	1	1	1	1	1	1	1	1	1	1	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	12	12	12	12	11	12	12	12	12	12
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.86	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Fit	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fit Protected	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	5605	2943	1310	1624	1710	1710	2943	1310	1624	1710	1710	1710
Fit Permitted	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (perm)	5605	2943	1310	1624	1710	1710	2943	1310	1624	1710	1710	1710
Volume (vph)	205	2615	15	0	0	0	0	1215	705	310	125	0
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	207	2641	15	0	0	0	0	1227	712	313	126	0
RTOR Reduction (vph)	0	1	0	0	0	0	0	5	19	0	0	0
Lane Group Flow (vph)	0	2862	0	0	0	0	0	1327	588	313	126	0
Heavy Vehicles (%)	1%	1%	1%	0%	0%	0%	1%	1%	1%	0%	0%	0%
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	4	4	4	4	4	4	4	4	4	4
Permitted Phases	4	4	4	4	4	4	4	4	4	4	4	4
Actuated Green, G (s)	44.5	44.5	44.5	44.5	44.5	44.5	44.5	44.5	44.5	44.5	44.5	44.5
Effective Green, g (s)	47.0	47.0	47.0	47.0	47.0	47.0	47.0	47.0	47.0	47.0	47.0	47.0
Actuated g/C Ratio	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39
Clearance Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	2195	1055	469	284	955	955	1055	469	284	955	955	955
v/s Ratio Prot	0.51	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45
v/s Ratio Perm	1.30	1.26	1.25	1.10	1.10	1.10	1.26	1.25	1.10	1.10	1.10	1.10
Uniform Delay, d1	36.5	38.5	38.5	49.5	49.5	49.5	38.5	38.5	49.5	49.5	49.5	49.5
Progression Factor	0.83	1.01	1.01	1.24	1.24	1.24	0.83	0.83	1.24	1.24	1.24	1.24
Incremental Delay, d2	139.2	123.6	130.2	80.7	80.7	80.7	139.2	130.2	80.7	80.7	80.7	80.7
Delay (s)	169.5	162.5	169.1	141.9	141.9	141.9	169.5	162.5	169.1	141.9	141.9	141.9
Level of Service	F	F	F	F	F	F	F	F	F	F	F	F
Approach Delay (s)	169.5	162.5	169.1	141.9	141.9	141.9	169.5	162.5	169.1	141.9	141.9	141.9
Approach LOS	F	F	F	F	F	F	F	F	F	F	F	F
Intersection Summary												
HCM Average Control Delay	162.2	162.2	162.2	162.2	162.2	162.2	162.2	162.2	162.2	162.2	162.2	162.2
HCM Volume to Capacity ratio	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25
Actuated Cycle Length (s)	120.0	120.0	120.0	120.0	120.0	120.0	120.0	120.0	120.0	120.0	120.0	120.0
Intersection Capacity Utilization	120.6%	120.6%	120.6%	120.6%	120.6%	120.6%	120.6%	120.6%	120.6%	120.6%	120.6%	120.6%
Analysis Period (min)	15	15	15	15	15	15	15	15	15	15	15	15
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis 2025 Baseline Conditions - PM Peak Hour  
10: Mercer St & Fairview Ave 500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR	SBR
Lane Configurations	4	1	1	1	1	1	1	1	1	1	1	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	12	12	12	12	11	12	12	12	12	12
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Fit	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fit Protected	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	4512	1454	3120	2533	1566	2558	4512	1454	3120	2533	1566	2558
Fit Permitted	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (perm)	4512	1454	3120	2533	1566	2558	4512	1454	3120	2533	1566	2558
Volume (vph)	5	3585	355	75	470	2150	340	1480	15	70	70	70
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	5	3696	366	77	485	2216	351	1526	15	72	72	72
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	3701	437	0	485	2169	351	1540	0	72	72	72
Heavy Vehicles (%)	0%	0%	0%	0%	1%	1%	0%	0%	0%	0%	0%	0%
Turn Type	Split	Split	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	1	1	1	1	1	1	1	1	1	1	1	1
Permitted Phases	1	1	1	1	1	1	1	1	1	1	1	1
Actuated Green, G (s)	69.5	69.5	69.5	69.5	69.5	69.5	69.5	69.5	69.5	69.5	69.5	69.5
Effective Green, g (s)	72.0	72.0	72.0	72.0	72.0	72.0	72.0	72.0	72.0	72.0	72.0	72.0
Actuated g/C Ratio	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
Clearance Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	2707	872	390	1900	319	895	323	323	323	323	323	323
v/s Ratio Prot	0.82	0.30	0.16	0.86	0.22	0.60	0.04	0.04	0.04	0.04	0.04	0.04
v/s Ratio Perm	1.37	0.50	1.24	1.14	1.10	1.72	0.22	0.22	0.22	0.22	0.22	0.22
Uniform Delay, d1	24.0	13.7	52.5	15.0	48.0	39.0	40.2	40.2	40.2	40.2	40.2	40.2
Progression Factor	0.48	0.45	1.00	1.00	1.00	1.00	0.67	0.67	0.67	0.67	0.67	0.67
Incremental Delay, d2	165.5	0.2	129.6	70.6	80.0	329.2	0.4	0.4	0.4	0.4	0.4	0.4
Delay (s)	176.9	6.4	182.1	85.6	128.0	368.2	27.2	27.2	27.2	27.2	27.2	27.2
Level of Service	F	A	F	F	F	F	C	C	C	C	C	C
Approach Delay (s)	158.7	6.4	182.1	85.6	128.0	368.2	27.2	27.2	27.2	27.2	27.2	27.2
Approach LOS	F	A	F	F	F	F	C	C	C	C	C	C
Intersection Summary												
HCM Average Control Delay	175.9	6.4	182.1	85.6	128.0	368.2	27.2	27.2	27.2	27.2	27.2	27.2
HCM Volume to Capacity ratio	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50
Actuated Cycle Length (s)	120.0	120.0	120.0	120.0	120.0	120.0	120.0	120.0	120.0	120.0	120.0	120.0
Intersection Capacity Utilization	190.5%	190.5%	190.5%	190.5%	190.5%	190.5%	190.5%	190.5%	190.5%	190.5%	190.5%	190.5%
Analysis Period (min)	15	15	15	15	15	15	15	15	15	15	15	15
c Critical Lane Group												



11: Republican St & 5th Ave

HCM Signalized Intersection Capacity Analysis

2025 Baseline Conditions - PM Peak Hour

500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	12	12	12	12	12	12	12	12	12	12	12	12
Lane Width	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Total Lost time (s)	0.95	0.95	1.00	0.91	1.00	0.99	1.00	0.95	1.00	0.95	1.00	0.95
Lane Util. Factor	1.00	0.98	1.00	1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	0.98	1.00	0.87	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	0.85	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.97	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1859	1448	1481	4913	1673	3317	1673	3317	1673	3317	1673	3317
Flt Permitted	0.97	1.00	0.52	1.00	0.52	1.00	0.52	1.00	0.52	1.00	0.52	1.00
Satd. Flow (perm)	1659	1448	816	4913	1659	1448	816	4913	1659	1448	816	4913
Volume (vph)	0	0	10	5	20	1375	5	10	340	10	340	10
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	0	0	11	5	22	1478	5	11	366	11	366	11
RTOR Reduction (vph)	0	0	0	0	16	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	16	6	22	1483	0	11	375	0	0
Confl. Peds. (#/hr)	10	20	20	75	20	20	20	20	20	20	20	20
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	2%	2%	2%	4%	4%	4%
Parking (#/hr)	8	8	8	8	8	8	8	8	8	8	8	8
Turn Type	Protected Phases	Protected Phases	Protected Phases	Protected Phases	Protected Phases	Protected Phases	Protected Phases	Protected Phases	Protected Phases	Protected Phases	Protected Phases	Protected Phases
Permitted Phases	6	6	6	6	6	6	6	6	6	6	6	6
Actuated Green, G (s)	20.0	20.0	49.0	49.0	49.0	49.0	49.0	49.0	49.0	49.0	49.0	49.0
Effective Green, g (s)	22.0	22.0	52.0	52.0	52.0	52.0	52.0	52.0	52.0	52.0	52.0	52.0
Actuated g/C Ratio	0.28	0.28	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65
Clearance Time (s)	5.0	5.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	456	398	530	3193	156	2156	156	2156	156	2156	156	2156
v/s Ratio Prot	0.01	0.00	0.03	0.03	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
v/c Ratio	0.04	0.02	0.04	0.46	0.07	0.17	0.07	0.17	0.07	0.17	0.07	0.17
Uniform Delay, d1	21.2	21.1	5.0	7.0	5.1	5.5	5.1	5.5	5.1	5.5	5.1	5.5
Progression Factor	1.00	1.00	0.79	0.48	0.82	0.88	0.82	0.88	0.82	0.88	0.82	0.88
Incremental Delay, d2	0.0	0.0	0.1	0.4	0.9	0.2	0.9	0.2	0.9	0.2	0.9	0.2
Delay (s)	21.3	21.1	4.1	3.7	5.1	5.0	5.1	5.0	5.1	5.0	5.1	5.0
Level of Service	C	C	A	A	A	A	A	A	A	A	A	A
Approach Delay (s)	0.0	0.0	3.7	3.7	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Approach LOS	A	A	C	C	A	A	A	A	A	A	A	A
Intersection Summary	Intersection Summary	Intersection Summary	Intersection Summary	Intersection Summary	Intersection Summary	Intersection Summary	Intersection Summary	Intersection Summary	Intersection Summary	Intersection Summary	Intersection Summary	Intersection Summary
HCM Average Control Delay	4.3	4.3	HCM Level of Service	HCM Level of Service	HCM Level of Service	HCM Level of Service	HCM Level of Service	HCM Level of Service	HCM Level of Service	HCM Level of Service	HCM Level of Service	HCM Level of Service
HCM Volume to Capacity ratio	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34
Actuated Cycle Length (s)	80.0	80.0	Sum of lost time (s)	Sum of lost time (s)	Sum of lost time (s)	Sum of lost time (s)	Sum of lost time (s)	Sum of lost time (s)	Sum of lost time (s)	Sum of lost time (s)	Sum of lost time (s)	Sum of lost time (s)
Intersection Capacity Utilization	44.0%	44.0%	ICU Level of Service	ICU Level of Service	ICU Level of Service	ICU Level of Service	ICU Level of Service	ICU Level of Service	ICU Level of Service	ICU Level of Service	ICU Level of Service	ICU Level of Service
Analysis Period (min)	15	15	15	15	15	15	15	15	15	15	15	15
c Critical Lane Group	c Critical Lane Group	c Critical Lane Group	c Critical Lane Group	c Critical Lane Group	c Critical Lane Group	c Critical Lane Group	c Critical Lane Group	c Critical Lane Group	c Critical Lane Group	c Critical Lane Group	c Critical Lane Group	c Critical Lane Group

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Synchro 6 Report

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12: Harrison St & 5th Ave

HCM Signalized Intersection Capacity Analysis

2025 Baseline Conditions - PM Peak Hour

500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	12	12	12	12	12	12	12	12	12	12	12	12
Lane Width	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Total Lost time (s)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Util. Factor	1.00	0.91	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	0.91	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	0.91	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1517	1236	1670	2748	1509	3334	1517	1236	1670	2748	1509	3334
Flt Permitted	0.73	1.00	0.85	1.00	0.52	1.00	0.52	1.00	0.52	1.00	0.52	1.00
Satd. Flow (perm)	1163	1236	1473	2748	819	3334	1163	1236	1473	2748	819	3334
Volume (vph)	15	0	30	30	10	780	30	605	15	5	320	10
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	16	0	33	33	11	857	33	665	16	5	352	11
RTOR Reduction (vph)	0	20	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	16	13	0	0	44	857	33	680	0	0	366	0
Confl. Peds. (#/hr)	19%	19%	19%	19%	19%	19%	19%	19%	19%	19%	19%	19%
Heavy Vehicles (%)	19%	19%	19%	19%	19%	19%	19%	19%	19%	19%	19%	19%
Turn Type	Protected Phases	Protected Phases	Protected Phases	Protected Phases	Protected Phases	Protected Phases	Protected Phases	Protected Phases	Protected Phases	Protected Phases	Protected Phases	Protected Phases
Permitted Phases	2	2	2	2	2	2	2	2	2	2	2	2
Actuated Green, G (s)	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5
Effective Green, g (s)	30.5	30.5	30.5	30.5	30.5	30.5	30.5	30.5	30.5	30.5	30.5	30.5
Actuated g/C Ratio	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	443	471	562	1048	445	1813	443	471	562	1048	445	1813
v/s Ratio Prot	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
v/c Ratio	0.04	0.03	0.08	0.82	0.07	0.37	0.07	0.37	0.07	0.37	0.07	0.37
Uniform Delay, d1	15.5	15.5	15.8	22.3	8.7	10.5	8.7	10.5	8.7	10.5	8.7	10.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.0	0.0	0.1	5.1	0.1	0.3	0.1	0.3	0.1	0.3	0.1	0.3
Delay (s)	15.6	15.5	15.8	27.3	13.6	16.1	13.6	16.1	13.6	16.1	13.6	16.1
Level of Service	B	B	B	C	B	B	B	B	B	B	B	B
Approach Delay (s)	15.5	15.5	26.7	26.7	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0
Approach LOS	B	B	C	C	B	B	B	B	B	B	B	B
Intersection Summary	Intersection Summary	Intersection Summary	Intersection Summary	Intersection Summary	Intersection Summary	Intersection Summary	Intersection Summary	Intersection Summary	Intersection Summary	Intersection Summary	Intersection Summary	Intersection Summary
HCM Average Control Delay	20.2	20.2	HCM Level of Service	HCM Level of Service	HCM Level of Service	HCM Level of Service	HCM Level of Service	HCM Level of Service	HCM Level of Service	HCM Level of Service	HCM Level of Service	HCM Level of Service
HCM Volume to Capacity ratio	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56
Actuated Cycle Length (s)	80.0	80.0	Sum of lost time (s)	Sum of lost time (s)	Sum of lost time (s)	Sum of lost time (s)	Sum of lost time (s)	Sum of lost time (s)	Sum of lost time (s)	Sum of lost time (s)	Sum of lost time (s)	Sum of lost time (s)
Intersection Capacity Utilization	67.8%	67.8%	ICU Level of Service	ICU Level of Service	ICU Level of Service	ICU Level of Service	ICU Level of Service	ICU Level of Service	ICU Level of Service	ICU Level of Service	ICU Level of Service	ICU Level of Service
Analysis Period (min)	15	15	15	15	15	15	15	15	15	15	15	15
c Critical Lane Group	c Critical Lane Group	c Critical Lane Group	c Critical Lane Group	c Critical Lane Group	c Critical Lane Group	c Critical Lane Group	c Critical Lane Group	c Critical Lane Group	c Critical Lane Group	c Critical Lane Group	c Critical Lane Group	c Critical Lane Group

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Synchro 6 Report

1/17/06

HCM Unsignalized Intersection Capacity Analysis  
2025 Baseline Conditions - PM Peak Hour  
500 Fifth Avenue North  
13: Harrison St & Broad St

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Volume (veh/h)	0	0	5	0	0	65	0	755	15	0	1090	755
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	0	0	5	0	0	67	0	778	15	0	1124	778
Pedestrians	20											
Lane Width (ft)	11.0											
Walking Speed (ft/s)	4.0											
Percent Blockage	2											
Right turn flare (veh)	None											
Median type	None											
Median storage (veh)	None											
Upstream signal (ft)	None											
pX, platoon unblocked	None											
vC, conflicting volume	None											
vC1, stage 1 conf vol	None											
vC2, stage 2 conf vol	None											
vCu, unblocked vol	1989	2327	971	1348	2708	397	1922					794
IC, single (s)	7.5	6.5	6.9	7.6	6.6	7.0	4.1					4.1
IC, 2 stage (s)												
IF (s)	3.5	4.0	3.3	3.6	4.0	3.4	2.2					2.2
p0 queue free %	100	100	98	100	100	89	100					100
cM capacity (veh/h)	32	37	252	103	20	594	303					830
Direction, Lane #												
	EB1	WB1	NE1	NE2	SW1	SW2						
Volume Total	5	67	519	275	749	1153						
Volume Left	0	0	0	0	0	0						
Volume Right	5	67	0	15	0	778						
cSH	252	594	1700	1700	1700	1700						
Volume to Capacity	0.02	0.11	0.31	0.16	0.44	0.68						
Queue Length 95th (ft)	2	9	0	0	0	0						
Control Delay (s)	19.6	11.8	0.0	0.0	0.0	0.0						
Lane LOS	C	B										
Approach Delay (s)	19.6	11.8	0.0									
Approach LOS	C	B										
Intersection Summary												
Average Delay	0.3											
Intersection Capacity Utilization	65.1%											
Analysis Period (min)	15											
	ICU Level of Service C											

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Synchro 6 Report  
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HCM Signalized Intersection Capacity Analysis  
14: 5th Ave & Broad St  
2025 Baseline Conditions - PM Peak Hour  
500 Fifth Avenue North

Movement	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	12	12	11	11	11	11	12	11	11	12
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95
Frbp, ped/bikes	0.99	1.00	1.00	0.85	1.00	1.00	1.00	1.00	1.00	1.00	0.99	1.00
Frbp, ped/bikes	1.00	1.00	1.00	0.85	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt	0.98	1.00	1.00	0.85	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	1.00	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3216	3331	3318	1694	3388	1646	3280	1646	3280	3331	3318	1694
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3059	3331	3318	1684	3388	1646	3280	1646	3280	3331	3318	1684
Volume (vph)	5	430	55	0	300	65	190	605	0	135	715	20
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	5	462	59	0	323	70	204	651	0	145	739	22
RTOR Reduction (vph)	0	12	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	514	0	0	323	70	204	651	0	145	788	0
Confl. Pedis. (#/hr)	115	85	85	85	115	130	130	3%	3%	45	45	130
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	3%	3%	3%	6%	6%	6%
Bus Blockages (#/hr)	0	20	0	0	18	0	0	0	0	0	0	0
Turn Type	Perm Prot											
Protected Phases	4											
Permitted Phases	4											
Actuated Green, G (s)	21.0	21.0	21.0	14.0	24.0	24.0	14.0	24.0	24.0	21.0	21.0	24.0
Effective Green, g (s)	27.0	27.0	27.0	17.0	27.0	27.0	17.0	27.0	27.0	27.0	27.0	27.0
Actuated g/C Ratio	0.34	0.34	0.34	0.21	0.34	0.34	0.21	0.34	0.34	0.21	0.34	0.34
Clearance Time (s)	9.0	9.0	9.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lane Grp Cap (vph)	1032	1124	445	360	1143	350	1100	350	1100	1124	445	360
v/s Ratio Prot	0.10 c0.12 0.19 0.09 c0.24											
v/s Ratio Perm	0.05											
v/c Ratio	3.280r	0.29	0.16	0.57	0.57	0.41	0.72	0.41	0.72	0.29	0.16	0.57
Uniform Delay, d1	21.1	19.4	18.5	28.2	21.7	27.2	23.2	27.2	23.2	19.4	18.5	28.2
Progression Factor	0.95	0.47	0.37	1.23	0.82	1.00	1.00	1.00	1.00	0.47	0.37	1.23
Incremental Delay, d2	1.7	0.6	0.7	5.8	1.9	3.6	4.0	3.6	4.0	0.6	0.7	5.8
Delay (s)	21.7	9.8	7.5	40.4	19.7	30.8	27.2	30.8	27.2	9.8	7.5	40.4
Level of Service	C	A	A	D	B	C	C	C	C	A	A	D
Approach Delay (s)	21.7	9.4	7.5	40.4	19.7	30.8	27.2	30.8	27.2	9.4	7.5	40.4
Approach LOS	C	A	A	D	B	C	C	C	C	A	A	D
Intersection Summary												
HCM Average Control Delay	22.9 HCM Level of Service C											
HCM Volume to Capacity ratio	0.60											
Actuated Cycle Length (s)	21.1											
Intersection Capacity Utilization	80.0 Sum of lost time (s) 9.0											
Analysis Period (min)	63.9% ICU Level of Service B											
df Defacto Right Lane	15											
df Defacto Left Lane	Recode with 1 though lane as a right lane.											
df Critical Lane Group												



HCM Signalized Intersection Capacity Analysis 2025 Baseline Conditions - PM Peak Hour  
15: Denny Way & 1st Avenue 500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SBL	SBR	NWL	NWR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Frt	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Flt Protected	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	3356	4875	4875	4875	4875	4875	4875	4875	4875	4875
Flt Permitted	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Satd. Flow (perm)	3177	4875	4875	4875	4875	4875	4875	4875	4875	4875
Volume (vph)	5	1320	375	0	1480	400	0	0	390	15
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	5	1404	399	0	1574	426	0	0	415	16
RTOR Reduction (vph)	0	26	0	0	49	0	0	0	0	0
Lane Group Flow (vph)	0	1782	0	0	1951	0	0	0	415	16
Heavy Vehicles (%)	4%	4%	4%	3%	3%	3%	0%	0%	5%	5%
Turn Type	1	1	1						Prot	2
Protected Phases										
Permitted Phases										
Actuated Green, G (s)	57.0	57.0	57.0	57.0	57.0	57.0	57.0	57.0	33.0	33.0
Effective Green, g (s)	59.0	59.0	59.0	59.0	59.0	59.0	59.0	59.0	35.0	35.0
Actuated g/C Ratio	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.35	0.35
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lane Grp Cap (vph)	1874	2876	602	511						
v/s Ratio Prot	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.24	0.24
v/s Ratio Perm	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.01	0.01
v/c Ratio	6.334	6.334	6.334	6.334	6.334	6.334	6.334	6.334	0.69	0.69
Uniform Delay, d1	19.1	14.0	14.0	14.0	14.0	14.0	14.0	14.0	27.8	21.4
Progression Factor	1.00	0.37	0.37	0.37	0.37	0.37	0.37	0.37	1.00	1.00
Incremental Delay, d2	12.1	0.7	0.7	0.7	0.7	0.7	0.7	0.7	6.3	0.1
Delay (s)	31.2	31.2	31.2	31.2	31.2	31.2	31.2	31.2	34.2	21.5
Level of Service	C	C	C	C	C	C	C	C	C	C
Approach Delay (s)	31.2	31.2	31.2	31.2	31.2	31.2	31.2	31.2	33.7	21.5
Approach LOS	C	C	C	C	C	C	C	C	C	C
Intersection Summary										
HCM Average Control Delay	19.5	19.5	19.5	19.5	19.5	19.5	19.5	19.5	19.5	19.5
HCM Volume to Capacity ratio	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Actuated Cycle Length (s)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Intersection Capacity Utilization	80.6%	80.6%	80.6%	80.6%	80.6%	80.6%	80.6%	80.6%	80.6%	80.6%
Analysis Period (min)	15	15	15	15	15	15	15	15	15	15
df Defacto Right Lane. Recode with 1 though lane as a right lane.										
c Critical Lane Group										

HCM Signalized Intersection Capacity Analysis 2025 Baseline Conditions - PM Peak Hour  
16: Denny Way & Broad St 500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	12	11	12	11	12	10	12	12	10
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Frtb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fltpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	3365	3292	3292	3292	3292	3292	3292	3292	3292	3292	3292
Flt Permitted	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Satd. Flow (perm)	2964	2964	2964	2964	2964	2964	2964	2964	2964	2964	2964
Volume (vph)	15	855	0	0	1575	10	0	550	65	5	520
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	16	910	0	0	1676	11	0	585	69	5	553
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	926	0	0	1687	0	0	645	0	0	558
Confl. Peds. (#/hr)	22	12	12	12	22	18	34	34	34	34	18
Heavy Vehicles (%)	3%	3%	3%	1%	1%	1%	1%	1%	1%	1%	1%
Bus Blockages (#/hr)	0	3	0	0	23	0	0	0	0	0	0
Turn Type	1	1	1	1	1	1	1	1	1	1	1
Protected Phases											
Permitted Phases											
Actuated Green, G (s)	58.0	58.0	58.0	58.0	58.0	58.0	58.0	58.0	58.0	58.0	58.0
Effective Green, g (s)	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0
Actuated g/C Ratio	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lane Grp Cap (vph)	1778	1975	1107	1107	1975	1107	1107	1077	467		
v/s Ratio Prot	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31
v/s Ratio Perm	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52
Uniform Delay, d1	11.6	16.4	16.4	16.4	16.4	16.4	16.4	16.4	16.4	16.4	16.4
Progression Factor	1.93	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65
Incremental Delay, d2	0.1	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6
Delay (s)	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5
Level of Service	C	C	C	C	C	C	C	C	C	C	C
Approach Delay (s)	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5
Approach LOS	C	C	C	C	C	C	C	C	C	C	C
Intersection Summary											
HCM Average Control Delay	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5
HCM Volume to Capacity ratio	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Actuated Cycle Length (s)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Intersection Capacity Utilization	71.8%	71.8%	71.8%	71.8%	71.8%	71.8%	71.8%	71.8%	71.8%	71.8%	71.8%
Analysis Period (min)	15	15	15	15	15	15	15	15	15	15	15
c Critical Lane Group											

HCM Signalized Intersection Capacity Analysis 2025 Baseline Conditions - PM Peak Hour  
17: Denny Way & 5th Ave 500 Fifth Avenue North

Movement	EBT	EBR	EBR2	WBT	WBR	NBL	NBT	NBR	NBR2	SBL2	SBL	SBL	SBL
Lane Configurations	4T	4T	4T	4T	4T	4T	4T	4T	4T	4T	4T	4T	4T
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	10	12	12	10	12	10	12	11	12	11	13
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Frpb, ped/bikes	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Flt Protected	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	3271	3271	3271	3271	3271	3271	3271	3271	3271	3271	3271	3271	3271
Flt Permitted	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (perm)	3271	3271	3271	3271	3271	3271	3271	3271	3271	3271	3271	3271	3271
Volume (vph)	820	195	15	910	155	5	160	40	10	115	195	115	115
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	872	207	16	968	165	5	170	43	11	122	207	122	122
RTOR Reduction (vph)	1	0	0	12	0	0	3	0	0	0	0	0	3
Lane Group Flow (vph)	1094	0	0	1121	0	0	226	0	0	0	329	130	130
Conf. Peds. (#/hr)	2	2	2	2	2	2	2	2	2	2	2	2	2
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	6%	6%	6%	3%	3%	3%	3%
Bus Blockages (#/hr)	3	0	0	4	0	0	18	0	0	0	0	0	0
Turn Type	Protected Phases	1	1	3	3	3	3	3	3	3	3	3	3
Permitted Phases	Permitted Phases	1	1	3	3	3	3	3	3	3	3	3	3
Actuated Green, G (s)	50.5	50.5	50.5	50.5	50.5	50.5	50.5	50.5	50.5	50.5	50.5	50.5	50.5
Effective Green, g (s)	52.5	52.5	52.5	52.5	52.5	52.5	52.5	52.5	52.5	52.5	52.5	52.5	52.5
Actuated g/C Ratio	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1717	1689	1689	1689	1689	1689	1689	1689	1689	1689	1689	1689	1689
v/s Ratio Prot	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
v/s Ratio Perm	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64
v/c Ratio	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0
Uniform Delay, d1	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34
Progression Factor	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Incremental Delay, d2	7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2
Delay (s)	A	A	A	A	A	A	A	A	A	A	A	A	A
Level of Service	A	A	A	A	A	A	A	A	A	A	A	A	A
Approach Delay (s)	7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2
Approach LOS	A	A	A	A	A	A	A	A	A	A	A	A	A
Intersection Summary													
HCM Average Control Delay	18.0												B
HCM Volume to Capacity ratio	0.67												B
Actuated Cycle Length (s)	100.0												9.0
Intersection Capacity Utilization	63.8%												B
Analysis Period (min)	15												
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis 2025 Baseline Conditions - PM Peak Hour  
17: Denny Way & 5th Ave 500 Fifth Avenue North

Movement	SBR
Lane Configurations	1900
Ideal Flow (vphpl)	12
Lane Width	
Total Lost time (s)	
Lane Util. Factor	
Frpb, ped/bikes	
Flpb, ped/bikes	
Flt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Volume (vph)	10
Peak-hour factor, PHF	0.94
Adj. Flow (vph)	11
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Conf. Peds. (#/hr)	17
Heavy Vehicles (%)	3%
Bus Blockages (#/hr)	0
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	
Intersection Summary	

Movement	EBT	EBR	EBR2	WBT	WBR	NBT	NBR	NBR2	SBL2	SBL	SBT	SBR
Lane Configurations	↑↑			↑↑		↑↑			↓	↓	↓	↓
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	11	12	12	12	12	12	12	12	12
Total Lost time (s)	3.0			3.0		3.0			3.0	3.0	3.0	3.0
Lane Util. Factor	0.95			0.95		0.95			1.00	0.95	0.95	0.95
Fit	0.99			0.97		0.98			1.00	0.85	0.85	0.85
Fit Protected	1.00			1.00		1.00			0.95	1.00	1.00	1.00
Satd. Flow (prot)	3081			3016		3154			1593	1332	1354	1354
Fit Permitted	1.00			1.00		1.00			0.95	1.00	1.00	1.00
Satd. Flow (perm)	3081			3016		3154			1593	1332	1354	1354
Volume (vph)	1070	65	5	1250	315	1125	165	5	245	80	0	490
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	1092	66	5	1276	321	1148	168	5	250	82	0	500
RTOR Reduction (vph)	0	0	0	22	0	0	0	0	0	0	0	2
Lane Group Flow (vph)	1163	0	0	1575	0	1321	0	0	0	332	260	258
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	4	0
Turn Type	2			2		4			Prot	Prot	Prot	Prot
Protected Phases									3	3	8	8
Permitted Phases												
Actuated Green, G (s)	26.0			26.0		30.1			24.9	60.0	60.0	60.0
Effective Green, g (s)	32.0			32.0		32.1			26.9	62.0	62.0	62.0
Actuated g/C Ratio	0.32			0.32		0.32			0.27	0.62	0.62	0.62
Clearance Time (s)	9.0			9.0		5.0			5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0			3.0		3.0			3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	986			965		1012			429	826	839	839
v/s Ratio Prot	0.38			c0.52		c0.42			c0.21	0.20	0.19	0.19
v/s Ratio Perm												
Uniform Delay, d1	1.18			1.63		1.31			0.77	0.31	0.31	0.31
Progression Factor	34.0			34.0		34.0			33.7	9.0	8.9	8.9
Incremental Delay, d2	1.00			0.55		1.00			1.00	1.00	1.00	1.00
Delay (s)	90.6			287.1		144.6			8.5	0.2	0.2	0.2
Level of Service	124.4			305.9		178.6			42.2	9.2	9.1	9.1
Approach Delay (s)	F			F		F			D	A	A	A
Approach LOS	124.4			305.9		178.6			22.0			
Intersection Summary				F		F			C			
HCM Average Control Delay	180.0					HCM Level of Service			F			
HCM Volume to Capacity ratio	1.26											
Actuated Cycle Length (s)	100.0					Sum of lost time (s)			9.0			
Intersection Capacity Utilization	120.1%					ICU Level of Service			H			
Analysis Period (min)	15											
Critical Lane Group												

Movement	SBR2
Lane Configurations	12
Ideal Flow (vphpl)	1900
Lane Width	12
Total Lost time (s)	
Lane Util. Factor	
Fit	
Fit Protected	
Satd. Flow (prot)	
Fit Permitted	
Satd. Flow (perm)	
Volume (vph)	20
Peak-hour factor, PHF	0.98
Adj. Flow (vph)	20
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Heavy Vehicles (%)	2%
Bus Blockages (#/hr)	0
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	
Intersection Summary	

HCM Signalized Intersection Capacity Analysis 2025 Baseline Conditions - PM Peak Hour  
 19: Denny Way & Dexter Avenue 500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4T	4T	4T	4T	4T	4T	4T	4T	4T	4T	4T	4T
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Fit	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fit Protected	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Satd. Flow (prot)	3195	3210	3210	3210	3210	3210	3210	3210	3210	3210	3210	3210
Fit Permitted	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52
Satd. Flow (perm)	1673	1673	1673	1673	1673	1673	1673	1673	1673	1673	1673	1673
Volume (vph)	155	1225	10	0	1250	110	10	215	20	115	280	260
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	165	1303	11	0	1330	117	11	229	21	122	298	277
RTOR Reduction (vph)	0	0	0	0	5	0	0	9	0	0	0	215
Lane Group Flow (vph)	0	1479	0	0	1442	0	11	241	0	122	298	62
Heavy Vehicles (%)	1%	1%	1%	0%	0%	0%	11%	11%	11%	2%	2%	2%
Turn Type	pm+pt	pm+pt	pm+pt	pm+pt	pm+pt	pm+pt	pm+pt	pm+pt	pm+pt	pm+pt	pm+pt	pm+pt
Protected Phases	2	5	1	3	3	3	3	3	3	3	3	3
Permitted Phases	5	5	1	3	3	3	3	3	3	3	3	3
Actuated Green, G (s)	68.7	50.7	19.3	19.3	19.3	19.3	19.3	19.3	19.3	19.3	19.3	19.3
Effective Green, g (s)	71.7	53.7	22.3	22.3	22.3	22.3	22.3	22.3	22.3	22.3	22.3	22.3
Actuated g/C Ratio	0.72	0.54	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1428	1724	157	644	192	710	318	318	318	318	318	318
v/s Ratio Prot	c0.16	0.45	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
v/s Ratio Perm	c0.59	0.84	0.07	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37
v/c Ratio	1.04	0.64	0.07	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37
Uniform Delay, d1	14.1	19.5	30.7	32.9	35.2	33.3	31.6	31.6	31.6	31.6	31.6	31.6
Progression Factor	0.80	0.65	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	18.8	4.7	0.2	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.3
Delay (s)	30.1	17.3	30.9	33.3	35.2	33.3	31.9	31.9	31.9	31.9	31.9	31.9
Level of Service	C	B	C	C	C	C	C	C	C	C	C	C
Approach Delay (s)	30.1	17.3	33.2	33.2	33.2	33.2	34.4	34.4	34.4	34.4	34.4	34.4
Approach LOS	C	B	C	C	C	C	C	C	C	C	C	C
Intersection Summary												
HCM Average Control Delay	26.3											
HCM Volume to Capacity ratio	0.93											
Actuated Cycle Length (s)	100.0											
Intersection Capacity Utilization	113.0%											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis 2025 Baseline Conditions - PM Peak Hour  
 20: Denny Way & Westlake Ave 500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4T	4T	4T	4T	4T	4T	4T	4T	4T	4T	4T	4T
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Fit	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fit Protected	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Satd. Flow (prot)	3085	3085	3085	3085	3085	3085	3085	3085	3085	3085	3085	3085
Fit Permitted	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (perm)	3085	3085	3085	3085	3085	3085	3085	3085	3085	3085	3085	3085
Volume (vph)	0	1405	80	0	1180	280	0	685	230	110	150	60
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	0	1495	85	0	1255	298	0	729	245	117	160	64
RTOR Reduction (vph)	0	4	0	0	21	0	0	13	0	0	24	0
Lane Group Flow (vph)	0	1576	0	0	1532	0	0	961	0	117	200	0
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	0%	0%
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	1	1	1	1	1	1	1	1	1	1	1	1
Permitted Phases	1	1	1	1	1	1	1	1	1	1	1	1
Actuated Green, G (s)	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
Effective Green, g (s)	52.0	52.0	52.0	52.0	52.0	52.0	52.0	52.0	52.0	52.0	52.0	52.0
Actuated g/C Ratio	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1604	1570	1570	1570	1570	1570	1570	1570	1570	1570	1570	1570
v/s Ratio Prot	c0.51	0.51	0.51	0.51	0.51	0.51	0.51	0.51	0.51	0.51	0.51	0.51
v/s Ratio Perm	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
v/c Ratio	23.5	23.5	23.5	23.5	23.5	23.5	23.5	23.5	23.5	23.5	23.5	23.5
Uniform Delay, d1	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	17.8	17.8	17.8	17.8	17.8	17.8	17.8	17.8	17.8	17.8	17.8	17.8
Delay (s)	31.9	31.9	31.9	31.9	31.9	31.9	31.9	31.9	31.9	31.9	31.9	31.9
Level of Service	C	C	C	C	C	C	C	C	C	C	C	C
Approach Delay (s)	31.9	31.9	31.9	31.9	31.9	31.9	31.9	31.9	31.9	31.9	31.9	31.9
Approach LOS	C	C	C	C	C	C	C	C	C	C	C	C
Intersection Summary												
HCM Average Control Delay	36.1											
HCM Volume to Capacity ratio	1.02											
Actuated Cycle Length (s)	100.0											
Intersection Capacity Utilization	92.1%											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis 2025 Baseline Conditions - PM Peak Hour  
21: Denny Way & Fairview Ave 500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	GBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	11	11	12	11	11	12	9	10	12	10	10	12
Lane Width	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Total Lost time (s)	1.00	1.00	1.00	0.95	1.00	0.95	0.97	0.95	1.00	0.95	1.00	0.95
Lane Util. Factor	1.00	1.00	1.00	0.95	1.00	0.95	0.95	1.00	0.95	1.00	0.95	1.00
Flt Protected	1555	3108	1555	3051	1555	3051	2808	2873	1501	2852		
Satd. Flow (prot)	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00		
Flt Permitted	1555	3108	1555	3051	1555	3051	2808	2873	1501	2852		
Satd. Flow (perm)	235	1095	5	50	805	115	455	545	220	265	340	170
Volume (vph)	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Peak-hour factor, PHF	245	1141	5	52	839	120	474	568	229	276	354	177
Adj. Flow (vph)	0	0	0	0	0	0	0	0	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	245	1146	0	52	948	0	474	751	0	276	466	0
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	1	6	5	2	3	8	7	4				
Permitted Phases												
Actuated Green, G (s)	13.5	34.7	6.8	28.0	18.4	29.5	9.0	20.1				
Effective Green, g (s)	15.5	36.7	8.8	30.0	20.4	31.5	11.0	22.1				
Actuated g/C Ratio	0.16	0.37	0.09	0.30	0.20	0.32	0.11	0.22				
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0				
Lane Grp Cap (vph)	241	1141	137	915	573	905	165	630				
v/s Ratio Prot	c0.16	c0.37	0.03	0.31	c0.17	c0.26	c0.18	0.16				
v/s Ratio Perm												
v/c Ratio	1.02	1.00	0.38	1.04	0.83	0.83	1.67	0.74				
Uniform Delay, d1	42.2	31.6	43.0	35.0	38.1	31.8	44.5	36.3				
Progression Factor	1.00	1.00	0.89	1.22	1.00	1.00	1.07	0.86				
Incremental Delay, d2	62.3	27.7	1.4	36.2	9.5	6.4	326.8	4.5				
Delay (s)	104.6	59.4	39.6	79.0	47.7	38.1	374.7	35.6				
Level of Service	F	E	D	E	D	D	F	D				
Approach Delay (s)	67.3			77.0		41.7		151.6				
Approach LOS	E			E		D		F				
Intersection Summary												
HCM Average Control Delay	77.4											
HCM Volume to Capacity ratio	1.01											
Actuated Cycle Length (s)	100.0											
Intersection Capacity Utilization	97.5%											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis 2025 Baseline Conditions - PM Peak Hour  
22: Denny Way & Stewart St 500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	GBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Total Lost time (s)	0.95	0.92	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99
Lane Util. Factor	0.95	0.92	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99
Flt Protected	2976	2976	1593	1676	1593	1676	1593	1676	1593	1676	1593	1676
Satd. Flow (prot)	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Flt Permitted	2976	2976	1593	1676	1593	1676	1593	1676	1593	1676	1593	1676
Satd. Flow (perm)	0	805	805	345	900	0	0	0	0	0	145	1095
Volume (vph)	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Peak-hour factor, PHF	0	821	821	352	918	0	0	0	0	0	148	1117
Adj. Flow (vph)	0	40	0	0	0	0	0	0	0	0	0	9
RTOR Reduction (vph)	0	1602	0	352	918	0	0	0	0	0	0	1338
Lane Group Flow (vph)	1%	1%	1%	2%	2%	2%	0%	0%	0%	0%	11%	11%
Heavy Vehicles (%)	1%	1%	1%	2%	2%	2%	0%	0%	0%	0%	11%	11%
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	3	2	2	2	3	1	1					
Permitted Phases												
Actuated Green, G (s)	43.5	21.5	21.5	69.5	21.5	21.5	21.5					
Effective Green, g (s)	45.0	23.0	23.0	71.0	23.0	23.0	23.0					
Actuated g/C Ratio	0.45	0.23	0.23	0.71	0.23	0.23	0.23					
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5					
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0					
Lane Grp Cap (vph)	1339	366	366	1190	366	366	366					
v/s Ratio Prot	c0.54	c0.22	c0.22	0.55	c0.22	c0.22	c0.22					
v/s Ratio Perm												
v/c Ratio	1.20	0.96	0.96	0.77	0.96	0.96	0.96					
Uniform Delay, d1	27.5	38.1	38.1	9.3	38.1	38.1	38.1					
Progression Factor	0.86	1.00	1.00	1.00	1.00	1.00	1.00					
Incremental Delay, d2	95.4	38.3	38.3	3.2	38.3	38.3	38.3					
Delay (s)	119.1	76.4	76.4	12.5	76.4	76.4	76.4					
Level of Service	F	E	E	B	E	E	E					
Approach Delay (s)	119.1			30.2								
Approach LOS	F			C								
Intersection Summary												
HCM Average Control Delay	87.2											
HCM Volume to Capacity ratio	1.12											
Actuated Cycle Length (s)	100.0											
Intersection Capacity Utilization	106.3%											
Analysis Period (min)	15											
c Critical Lane Group												



HCM Signalized Intersection Capacity Analysis 2025 Baseline Conditions - PM Peak Hour  
 23: Yale St & Stewart St 500 Fifth Avenue North

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Total Lost time (s)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	1.00	1.00	0.95	1.00	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	1693	1439	1593	1676			1477	4241				
Flt Permitted	1.00	1.00	0.09	1.00			0.95	1.00				
Satd. Flow (perm)	1693	1439	153	1676			1477	4241				
Volume (vph)	0	685	115	65	5	0	0	0	0	430	1010	5
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	0	729	122	69	5	0	0	0	0	457	1074	5
RTOR Reduction (vph)	0	0	32	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	729	90	69	5	0	0	0	0	457	1078	0
Heavy Vehicles (%)	1%	1%	1%	2%	2%	2%	0%	0%	0%	10%	10%	10%
Turn Type	3	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	3	3	3	3	3	3	3	3	3	3	3	3
Permitted Phases	43.5	43.5	43.5	43.5	43.5	43.5	43.5	43.5	43.5	43.5	43.5	43.5
Actuated Green, G (s)	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0
Effective Green, g (s)	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45
Actuated g/C Ratio	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Clearance Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Vehicle Extension (s)	762	648	69	754			724	2078				
Lane Grp Cap (vph)	0.43	0.06	0.45	0.00	0.00	0.00	0.31	0.25				
v/s Ratio Prot	0.96	0.14	1.00	0.01	0.01	0.01	0.63	0.52				
v/s Ratio Perm	26.6	16.1	27.5	15.2	15.2	15.2	18.8	17.4				
Uniform Delay, d1	0.74	0.29	1.06	1.19	1.19	1.19	0.71	0.66				
Progression Factor	16.4	0.1	78.8	0.0	0.0	0.0	0.4	0.1				
Incremental Delay, d2	36.0	4.8	108.1	18.0	18.0	18.0	13.8	11.6				
Delay (s)	D	A	F	B	B	B	B	B				
Level of Service	C	A	F	B	B	B	B	B				
Approach Delay (s)	31.5			102.0			0.0	12.2				
Approach LOS	C			F			A	B				
Intersection Summary												
HCM Average Control Delay	21.6											
HCM Volume to Capacity ratio	0.81											
Actuated Cycle Length (s)	100.0											
Intersection Capacity Utilization	80.5%											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis 2025 Baseline Conditions - PM Peak Hour  
 24: Yale St & Howell St 500 Fifth Avenue North

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Total Lost time (s)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	1593	1339					3115	1398				
Flt Permitted	0.95	1.00					0.92	1.00				
Satd. Flow (perm)	1593	1339					2866	1398				
Volume (vph)	55	1045	10	0	0	0	60	920	860	0	200	5
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	57	1089	10	0	0	0	62	958	896	0	208	5
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	57	1099	0	0	0	0	1020	842	0	212	0	0
Heavy Vehicles (%)	2%	2%	2%	0%	0%	0%	4%	4%	4%	2%	2%	2%
Parking (#/hr)	20											
Turn Type	Split	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	2	2					1	1	1			
Permitted Phases	55.0	55.0					35.0	35.0	35.0			
Actuated Green, G (s)	57.0	57.0					37.0	37.0	37.0			
Effective Green, g (s)	0.57	0.57					0.37	0.37	0.37			
Actuated g/C Ratio	5.0	5.0					5.0	5.0	5.0			
Clearance Time (s)	3.0	3.0					3.0	3.0	3.0			
Vehicle Extension (s)	908	763					1060	517	618			
Lane Grp Cap (vph)	0.04	0.82					0.36	0.60	0.13			
v/s Ratio Prot	0.06	1.44					0.96	1.63	0.34			
v/s Ratio Perm	9.6	21.5					30.8	31.5	22.7			
Uniform Delay, d1	1.42	1.54					1.00	1.00	1.00			
Progression Factor	0.0	201.9					19.9	291.5	1.5			
Incremental Delay, d2	13.6	235.0					50.7	323.0	24.3			
Delay (s)	B	F					D	F	C			
Level of Service	C	F					D	F	C			
Approach Delay (s)	224.1						178.1		24.3			
Approach LOS	F						F		C			
Intersection Summary												
HCM Average Control Delay	184.3											
HCM Volume to Capacity ratio	1.51											
Actuated Cycle Length (s)	100.0											
Intersection Capacity Utilization	127.6%											
Analysis Period (min)	15											
c Critical Lane Group												

## 2025 Alternative 2



# HCM Signalized Intersection Capacity Analysis

2025 With Alt 2 - AM Peak Hour  
500 Fifth Avenue North

2025 With Alt 2 - AM Peak Hour  
500 Fifth Avenue North



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	12	12	12	11	12	11	11	12	11	11	11	12
Lane Width	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Total Lost time (s)	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00	0.95	0.95	1.00
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	0.96	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.97	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	1.00
Satd. Flow (prot)	1396	1564	1326	1564	1326	1662	1432	1662	1432	1662	1432	1662
Flt Permitted	0.97	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	1.00
Satd. Flow (perm)	1396	1564	1326	1564	1326	1662	1432	1662	1432	1662	1432	1662
Volume (vph)	0	0	0	88	45	5	404	155	64	15	245	65
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	93	47	5	425	163	67	16	258	68
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	144	0	353	295	0	16	320	0	0
Conf. Peds. (#/hr)	0	0	0	20	14	14	12	12	12	28	0	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	6%	6%	6%	5%	5%	5%
Parking (#/hr)	0	0	0	15	0	0	8	8	8	8	8	8

Turn Type	Perm	Split	Split
Protected Phases	6	4	4
Permitted Phases	6	4	4
Actuated Green, G (s)	33.0	53.0	36.0
Effective Green, g (s)	36.0	56.0	39.0
Actuated g/C Ratio	0.26	0.40	0.28
Clearance Time (s)	6.0	6.0	6.0
Lane Grp Cap (vph)	359	626	463
v/s Ratio Prot	0.10	0.23	0.01
v/s Ratio Perm	0.40	0.56	0.03
Uniform Delay, d1	43.1	32.5	36.8
Progression Factor	0.99	0.16	1.00
Incremental Delay, d2	3.3	3.1	0.1
Delay (s)	46.2	8.2	36.9
Level of Service	D	A	D
Approach Delay (s)	46.2	8.2	61.2
Approach LOS	A	A	E

Intersection Summary			
HCM Average Control Delay	28.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	59.0%	ICU Level of Service	B
Analysis Period (min)	15		
Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	11	12	10	10	10	11	12	9	8	12	8	12
Lane Width	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Total Lost time (s)	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.94	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.85	1.00	0.85	1.00
Satd. Flow (prot)	2871	1479	2943	2943	2943	3760	1223	3760	1223	3760	1223	3760
Flt Permitted	1.00	0.21	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99
Satd. Flow (perm)	2871	328	2943	328	2943	3760	1223	3760	1223	3760	1223	3760
Volume (vph)	290	185	300	2187	155	170	695	154	5	695	154	5
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	309	197	319	2327	165	181	739	164	5	739	164	5
RTOR Reduction (vph)	86	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	420	0	319	2492	0	0	920	168	0	920	168	0
Conf. Peds. (#/hr)	50	50	50	50	50	50	50	50	50	50	50	50
Heavy Vehicles (%)	3%	3%	2%	2%	2%	3%	3%	3%	3%	3%	3%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0

Turn Type	1	2	12	Split	Prot
Protected Phases	1	2	12	3	3
Permitted Phases	12	12	12	3	3
Actuated Green, G (s)	16.5	75.0	80.5	28.5	28.5
Effective Green, g (s)	19.0	80.0	83.0	31.0	31.0
Actuated g/C Ratio	0.16	0.67	0.69	0.26	0.26
Clearance Time (s)	5.5	5.5	5.5	5.5	5.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	455	804	2036	971	316
v/s Ratio Prot	0.15	0.20	0.85	0.24	0.14
v/s Ratio Perm	0.92	0.40	1.22	0.95	0.53
Uniform Delay, d1	49.8	15.2	18.5	43.7	38.3
Progression Factor	1.00	0.21	0.14	1.00	1.00
Incremental Delay, d2	26.8	0.0	101.2	17.4	1.7
Delay (s)	76.6	3.2	103.9	61.1	40.0
Level of Service	E	A	F	E	D
Approach Delay (s)	76.6	92.5	57.8	57.8	57.8
Approach LOS	E	F	F	E	E

Intersection Summary			
HCM Average Control Delay	82.1	HCM Level of Service	F
HCM Volume to Capacity ratio	1.15		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	6.0
Intersection Capacity Utilization	98.1%	ICU Level of Service	F
Analysis Period (min)	15		
Critical Lane Group			

HCM Signalized Intersection Capacity Analysis  
3: Broad St & Westlake Ave

2025 With Alt 2 - AM Peak Hour  
500 Fifth Avenue North

2025 With Alt 2 - AM Peak Hour  
500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4T	1T	1T	4T	1T	1T	1T	1T	1T	1T	1T
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	12	12	10	12	12	10	12	12	12
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00	1.00	1.00
Flpb, ped/bikes	0.98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	0.96	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.97	1.00	1.00	0.85	1.00	0.91	1.00	1.00	1.00	1.00	1.00
Flt Permitted	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00
Satd. Flow (prot)	2953	1608	3002	1439	1528	2706	1624	1710	1624	1710	1710
Flt Permitted	0.71	0.47	1.00	1.00	0.33	1.00	0.19	1.00	0.19	1.00	1.00
Satd. Flow (perm)	2109	787	3002	1439	1525	2706	331	1710	331	1710	1710
Volume (vph)	15	355	80	355	2482	835	65	244	363	75	280
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	16	370	83	370	2585	870	68	254	378	78	292
RTOR Reduction (vph)	0	15	0	0	100	0	227	0	0	0	0
Lane Group Flow (vph)	0	454	0	370	2585	770	68	405	0	78	292
Confli. Peds. (#/hr)	1	1	1	1	1	1	1	1	1	1	1
Heavy Vehicles (%)	1	1	1	1	1	1	1	1	1	1	1
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	2	2	2	2	2	2	2	2	2	2	2
Permitted Phases	2	2	2	2	2	2	2	2	2	2	2
Actuated Green, G (s)	79.5	79.5	79.5	79.5	79.5	79.5	29.5	29.5	29.5	29.5	29.5
Effective Green, g (s)	82.0	82.0	82.0	82.0	82.0	82.0	32.0	32.0	32.0	32.0	32.0
Actuated g/C Ratio	0.68	0.68	0.68	0.68	0.68	0.68	0.27	0.27	0.27	0.27	0.27
Clearance Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1441	538	2051	983	140	722	88	456	88	456	456
v/s Ratio Prot	0.22	0.47	0.47	0.53	0.13	0.15	0.15	0.17	0.15	0.17	0.17
v/s Ratio Perm	0.31	0.69	1.26	0.78	0.49	0.56	0.89	0.64	0.89	0.64	0.64
Uniform Delay, d1	7.7	11.4	19.0	12.9	37.1	37.9	42.3	38.9	42.3	38.9	38.9
Progression Factor	0.73	0.63	0.64	0.48	1.49	2.19	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.0	2.3	119.7	2.6	5.5	1.5	68.3	6.7	68.3	6.7	6.7
Delay (s)	5.7	9.5	131.9	8.8	60.6	84.7	110.6	45.7	110.6	45.7	45.7
Level of Service	A	A	F	A	E	F	F	D	F	D	D
Approach Delay (s)	5.7	9.5	131.9	8.8	60.6	84.7	110.6	45.7	110.6	45.7	45.7
Approach LOS	A	A	F	A	E	F	F	D	F	D	D
Intersection Summary											
HCM Average Control Delay	81.0										
HCM Volume to Capacity ratio	1.15										
Actuated Cycle Length (s)	120.0										
Intersection Capacity Utilization	130.8%										
Analysis Period (min)	15										
c Critical Lane Group											

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Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	1T	1T	1T	1T	1T	1T
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	10	12	12	12	12	12
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	1.00	1.00	1.00	0.95	1.00
Flt Protected	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	2944	1411	842	3124	4491	1425
Flt Permitted	1.00	1.00	0.13	1.00	0.95	1.00
Satd. Flow (perm)	2944	1411	114	3124	4491	1425
Volume (vph)	688	20	5	834	2723	685
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	732	21	5	887	2897	729
RTOR Reduction (vph)	0	5	0	0	0	6
Lane Group Flow (vph)	732	16	5	887	2897	723
Heavy Vehicles (%)	3%	3%	100%	4%	2%	2%
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	4	4	4	4
Permitted Phases	4	4	4	4	4	4
Actuated Green, G (s)	28.0	28.0	37.0	42.0	68.0	82.0
Effective Green, g (s)	30.0	30.0	41.0	44.0	70.0	84.0
Actuated g/C Ratio	0.25	0.25	0.34	0.37	0.58	0.70
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	736	353	103	1145	2620	998
v/s Ratio Prot	0.25	0.01	0.01	0.28	0.65	0.51
v/s Ratio Perm	0.99	0.04	0.05	0.77	1.11	0.72
Uniform Delay, d1	44.9	34.1	28.1	33.6	25.0	11.0
Progression Factor	1.35	1.54	1.00	1.00	1.26	1.33
Incremental Delay, d2	30.7	0.2	0.2	3.3	48.2	0.2
Delay (s)	91.5	52.7	28.3	37.0	79.7	14.9
Level of Service	F	D	C	D	E	B
Approach Delay (s)	90.4			36.9	66.7	
Approach LOS	F			D	E	
Intersection Summary						
HCM Average Control Delay	65.0					
HCM Volume to Capacity ratio	1.03					
Actuated Cycle Length (s)	120.0					
Intersection Capacity Utilization	89.8%					
Analysis Period (min)	15					
c Critical Lane Group						

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HCM Signalized Intersection Capacity Analysis  
5: Mercer St & 1st Avenue

HCM Signalized Intersection Capacity Analysis  
6: Mercer St & 5th Ave

2025 With Alt 2 - AM Peak Hour

2025 With Alt 2 - AM Peak Hour

500 Fifth Avenue North

500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4↑	4↑	4↑	4↑	4↑	4↑	4↑	4↑	4↑	4↑	4↑	4↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	1.00	0.95	1.00	0.94	1.00	0.95	1.00	0.94	1.00	0.95	1.00
Fit Protected	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	3298	3298	3298	3298	3298	3298	3298	3298	3298	3298	3298	3298
Fit Permitted	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (perm)	3298	3298	3298	3298	3298	3298	3298	3298	3298	3298	3298	3298
Volume (vph)	45	1294	0	0	0	0	75	205	125	0	0	0
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	47	1348	0	0	0	0	78	214	130	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	33	0	0	0	0
Lane Group Flow (vph)	0	1395	0	0	0	0	78	311	0	0	0	0
Heavy Vehicles (%)	3%	3%	3%	0%	0%	0%	10%	10%	10%	0%	0%	0%
Parking (#/hr)	3	3	3	3	3	3	3	3	3	3	3	3
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	1	1	1	1	1	1	1	1	1	1	1	1
Permitted Phases	1	2	2	2	2	2	2	2	2	2	2	2
Actuated Green, G (s)	46.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0
Effective Green, g (s)	47.0	27.0	27.0	27.0	27.0	27.0	27.0	27.0	27.0	27.0	27.0	27.0
Actuated g/C Ratio	0.59	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Grp Cap (vph)	1938	554	972	554	972	554	972	554	972	554	972	554
v/s Ratio Prot	0.42	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
v/s Ratio Perm	0.72	0.14	0.32	0.14	0.32	0.14	0.32	0.14	0.32	0.14	0.32	0.14
Uniform Delay, d1	11.8	18.4	19.7	18.4	19.7	18.4	19.7	18.4	19.7	18.4	19.7	18.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.3	0.5	0.9	0.5	0.9	0.5	0.9	0.5	0.9	0.5	0.9	0.5
Delay (s)	14.1	19.0	20.5	19.0	20.5	19.0	20.5	19.0	20.5	19.0	20.5	19.0
Level of Service	B	B	C	B	C	B	C	B	C	B	C	B
Approach Delay (s)	14.1	20.3	20.3	20.3	20.3	20.3	20.3	20.3	20.3	20.3	20.3	20.3
Approach LOS	B	C	C	C	C	C	C	C	C	C	C	C
Intersection Summary												
HCM Average Control Delay	15.6	HCM Level of Service	B									
HCM Volume to Capacity ratio	0.57											
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	6.0									
Intersection Capacity Utilization	58.7%	ICU Level of Service	B									
Analysis Period (min)	15											
c Critical Lane Group												

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4↑	4↑	4↑	4↑	4↑	4↑	4↑	4↑	4↑	4↑	4↑	4↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.86	1.00	0.87	1.00	0.92	1.00	0.86	1.00	0.91	0.91	0.91	0.91
Fit Protected	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	5723	1303	5723	1303	5723	1303	5723	1303	5723	1303	5723	1303
Fit Permitted	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (perm)	5723	1303	5723	1303	5723	1303	5723	1303	5723	1303	5723	1303
Volume (vph)	15	1269	195	0	0	0	603	303	114	239	0	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	16	1336	205	0	0	0	635	319	120	252	0	0
RTOR Reduction (vph)	0	0	40	0	0	0	0	0	186	0	0	0
Lane Group Flow (vph)	0	1352	165	0	0	0	635	133	83	289	0	0
Heavy Vehicles (%)	4%	4%	4%	0%	0%	0%	5%	5%	5%	5%	5%	5%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)	25	25	25	25	25	25	25	25	25	25	25	25
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	2	2	2	2	2	2	2	2	2	2	2	2
Permitted Phases	2	4	4	4	4	4	4	4	4	4	4	4
Actuated Green, G (s)	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0
Effective Green, g (s)	46.0	46.0	46.0	46.0	46.0	46.0	46.0	46.0	46.0	46.0	46.0	46.0
Actuated g/C Ratio	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lane Grp Cap (vph)	1880	428	428	428	428	428	1162	471	519	1623		
v/s Ratio Prot	0.24	0.13	0.13	0.13	0.13	0.13	0.21	0.04	0.04	0.07		
v/s Ratio Perm	0.72	0.38	0.38	0.38	0.38	0.38	0.55	0.28	0.16	0.18		
Uniform Delay, d1	41.3	36.1	36.1	36.1	36.1	36.1	34.1	30.3	20.1	10.9		
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.92	0.88	2.35	2.28		
Incremental Delay, d2	2.4	2.6	2.6	2.6	2.6	2.6	1.8	1.4	0.5	0.2		
Delay (s)	43.7	38.7	38.7	38.7	38.7	38.7	33.2	31.1	47.6	25.0		
Level of Service	D	D	D	D	D	D	C	C	D	C		
Approach Delay (s)	43.1	38.7	38.7	38.7	38.7	38.7	32.5	31.1	47.6	30.0		
Approach LOS	D	D	D	D	D	D	C	C	D	C		
Intersection Summary												
HCM Average Control Delay	37.9	HCM Level of Service	D									
HCM Volume to Capacity ratio	0.51											
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	6.0									
Intersection Capacity Utilization	63.0%	ICU Level of Service	B									
Analysis Period (min)	15											
c Critical Lane Group												

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The Transpo Group 1/17/06

HCM Signalized Intersection Capacity Analysis  
 7: Mercer St & Dexter Avenue  
 2025 With Alt 2 - AM Peak Hour  
 500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBR	NBT	NBR	SBT	NEL	NER	NER2
Lane Configurations	4111	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	12	12	12	10	11	10	12	12	12	12
Lane Width	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Total Lost time (s)	0.86	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95
Lane Util. Factor	0.99	0.86	1.00	0.85	1.00	0.87	1.00	0.87	1.00	0.85
Flt Protected	1.00	1.00	1.00	1.00	0.95	1.00	0.99	1.00	1.00	1.00
Satd. Flow (prot)	5684	1382	2861	1326	1501	3217	1441	1341	1341	1341
Flt Permitted	1.00	1.00	1.00	1.00	0.49	1.00	0.99	1.00	1.00	1.00
Satd. Flow (perm)	5684	1382	2861	1326	769	3217	1441	1341	1341	1341
Volume (vph)	137	1800	155	35	195	70	250	595	30	300
Peak-hour factor, PHF	0.83	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	156	2045	176	40	222	80	284	676	34	341
RTOR Reduction (vph)	0	0	0	22	0	29	0	0	0	1
Lane Group Flow (vph)	0	2377	0	18	222	51	284	676	205	175
Heavy Vehicles (%)	2%	2%	2%	7%	6%	6%	1%	1%	3%	3%
Turn Type	Perm	Perm	custom	Perm	pm+pt	Perm	pm+pt	Perm	Prot	Prot
Protected Phases	1	1	4	4	3	7	2	2	2	2
Permitted Phases	1	1	4	4	7	4	7	4	7	4
Actuated Green, G (s)	60.0	80.0	30.0	30.0	48.0	48.0	14.0	14.0	14.0	14.0
Effective Green, g (s)	63.0	83.0	33.0	33.0	51.0	51.0	17.0	17.0	17.0	17.0
Actuated g/C Ratio	0.45	0.45	0.24	0.24	0.36	0.36	0.12	0.12	0.12	0.12
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lane Grp Cap (vph)	2558	622	674	313	359	1172	175	163	163	163
v/s Ratio Prot	0.01	0.08	0.03	0.03	0.08	0.21	0.14	0.13	0.13	0.13
v/s Ratio Perm	0.42	0.93	0.33	0.33	0.16	0.79	0.58	1.17	1.07	1.07
Uniform Delay, d1	36.4	21.5	44.3	42.5	37.4	35.8	61.5	61.5	61.5	61.5
Progression Factor	0.86	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	7.3	0.1	1.3	1.1	16.2	2.1	121.7	91.7	91.7	91.7
Delay (s)	38.6	21.5	45.6	43.6	53.6	37.9	183.2	153.2	153.2	153.2
Level of Service	D	C	D	D	D	D	F	F	F	F
Approach Delay (s)	38.6	45.1	42.5	169.3						
Approach LOS	D	D	D	F						
Intersection Summary										
HCM Average Control Delay	52.1	HCM Level of Service	D							
HCM Volume to Capacity ratio	0.91									
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	9.0							
Intersection Capacity Utilization	82.9%	ICU Level of Service	E							
Analysis Period (min)	15									
c Critical Lane Group										

HCM Signalized Intersection Capacity Analysis  
 8: Mercer St & 9th Ave  
 2025 With Alt 2 - AM Peak Hour  
 500 Fifth Avenue North

Movement	EBT	EBR	SBT	SEB	SEB	SEB
Lane Configurations	1111	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	11	12	12	9	12	11
Lane Width	3.0	3.0	3.0	3.0	3.0	3.0
Total Lost time (s)	0.86	1.00	0.91	0.91	1.00	0.91
Lane Util. Factor	1.00	0.86	1.00	0.86	0.99	0.99
Flt Protected	1.00	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	5536	1251	2647	1251	2647	1251
Flt Permitted	1.00	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	5536	1251	2647	1251	2647	1251
Volume (vph)	2145	105	465	825	35	0
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	2306	113	500	887	38	0
RTOR Reduction (vph)	6	0	4	3	0	0
Lane Group Flow (vph)	2413	0	453	965	0	0
Heavy Vehicles (%)	2%	2%	4%	4%	4%	0%
Bus Blockages (#/hr)	0	0	0	2	0	0
Turn Type	Perm	Perm	Perm	custom	custom	custom
Protected Phases	1	2	2	2	2	2
Permitted Phases	1	2	2	2	2	2
Actuated Green, G (s)	70.5	38.5	38.5	41.0	41.0	41.0
Effective Green, g (s)	73.0	41.0	41.0	44.0	44.0	44.0
Actuated g/C Ratio	0.61	0.34	0.34	0.34	0.34	0.34
Clearance Time (s)	5.5	5.5	5.5	5.5	5.5	5.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	3368	427	904	427	904	904
v/s Ratio Prot	c0.44	0.36	0.36	0.36	0.36	0.36
v/s Ratio Perm	0.72	1.06	1.07	1.06	1.07	1.07
Uniform Delay, d1	16.3	39.5	39.5	39.5	39.5	39.5
Progression Factor	1.00	0.69	0.70	0.69	0.70	0.70
Incremental Delay, d2	1.3	53.5	45.2	53.5	45.2	45.2
Delay (s)	17.7	80.8	72.8	80.8	72.8	72.8
Level of Service	B	F	E	F	E	E
Approach Delay (s)	17.7	75.4	75.4	75.4	75.4	75.4
Approach LOS	B	E	E	E	E	E
Intersection Summary						
HCM Average Control Delay	39.0	HCM Level of Service	D			
HCM Volume to Capacity ratio	0.84					
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	6.0			
Intersection Capacity Utilization	70.9%	ICU Level of Service	C			
Analysis Period (min)	15					
i Phase conflict between lane groups						
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis  
9: Mercer St & Westlake Ave

2025 With Alt 2 - AM Peak Hour

500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4TT	4TT	4TT	4TT	4TT	4TT	4TT	4TT	4TT	4TT	4TT	4TT
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	12	12	12	12	12	11	12	12	12	12
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.96	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Flt Protected	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	5532	5532	5532	5532	5532	5532	5532	5532	5532	5532	5532	5532
Flt Permitted	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (perm)	5532	5532	5532	5532	5532	5532	5532	5532	5532	5532	5532	5532
Volume (vph)	317	2643	50	0	0	0	0	380	120	205	330	0
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	330	2753	52	0	0	0	0	396	125	214	344	0
RTOR Reduction (vph)	0	2	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	3133	0	0	0	0	0	396	95	214	344	0
Heavy Vehicles (%)	2%	2%	2%	0%	0%	0%	0%	4%	4%	0%	0%	0%
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	4	4	4	4	4	6	6	5	2	2
Permitted Phases	4	4	4	4	4	4	4	6	6	5	2	2
Actuated Green, G (s)	69.6	69.6	69.6	69.6	69.6	69.6	69.6	17.2	17.2	15.7	39.4	39.4
Effective Green, g (s)	72.1	72.1	72.1	72.1	72.1	72.1	72.1	20.2	20.2	18.7	41.9	41.9
Actuated g/C Ratio	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.17	0.17	0.16	0.35	0.35
Clearance Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	6.0	6.0	6.0	5.5	5.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	3324	3324	3324	3324	3324	3324	3324	487	214	253	597	597
v/s Ratio Prot	0.57	0.57	0.57	0.57	0.57	0.57	0.57	c0.14	c0.13	c0.13	0.20	0.20
v/s Ratio Perm	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.81	0.44	0.85	0.58	0.58
Uniform Delay, d1	22.0	22.0	22.0	22.0	22.0	22.0	22.0	48.1	44.9	49.2	31.8	31.8
Progression Factor	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.92	0.87	0.89	0.94	0.94
Incremental Delay, d2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	10.0	1.5	17.9	1.1	1.1
Delay (s)	19.8	19.8	19.8	19.8	19.8	19.8	19.8	54.0	40.5	62.0	31.1	31.1
Level of Service	B	B	B	B	B	B	B	D	D	E	C	C
Approach Delay (s)	19.8	19.8	19.8	19.8	19.8	19.8	19.8	50.8	42.9	42.9	31.1	31.1
Approach LOS	B	B	B	B	B	B	B	D	D	E	C	C
Intersection Summary												
HCM Average Control Delay	26.7											
HCM Volume to Capacity ratio	0.90											
Actuated Cycle Length (s)	120.0											
Intersection Capacity Utilization	84.5%											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis  
10: Mercer St & Fairview Ave

2025 With Alt 2 - AM Peak Hour

500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4TT	4TT	4TT	4TT	4TT	4TT	4TT	4TT	4TT	4TT	4TT	4TT
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	12	12	12	12	12	10	12	12	12	12
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Flt Protected	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	4423	4423	4423	4423	4423	4423	4423	4423	4423	4423	4423	4423
Flt Permitted	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (perm)	4423	4423	4423	4423	4423	4423	4423	4423	4423	4423	4423	4423
Volume (vph)	10	2208	410	150	1545	3163	280	385	10	35	35	35
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	10	2276	423	155	1593	3261	289	397	10	36	36	36
RTOR Reduction (vph)	0	0	11	0	0	64	0	1	0	0	0	0
Lane Group Flow (vph)	0	2286	567	0	1593	3197	289	406	0	36	36	36
Heavy Vehicles (%)	2%	2%	2%	2%	2%	1%	3%	3%	3%	3%	21%	21%
Turn Type	Split	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	11	1	1	1	1	1	1	1	1	1	1	1
Permitted Phases	11	1	1	1	1	1	1	1	1	1	1	1
Actuated Green, G (s)	45.5	45.5	45.5	45.5	45.5	45.5	45.5	45.5	45.5	45.5	45.5	45.5
Effective Green, g (s)	48.0	48.0	48.0	48.0	48.0	48.0	48.0	48.0	48.0	48.0	48.0	48.0
Actuated g/C Ratio	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40
Clearance Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1769	570	1040	1921	297	1366	271	271	271	271	271	271
v/s Ratio Prot	0.52	0.40	0.40	0.51	c1.26	c0.19	0.16	0.16	0.16	0.16	0.16	0.16
v/s Ratio Perm	1.29	1.00	1.00	1.53	1.66	0.97	0.30	0.30	0.30	0.30	0.30	0.30
Uniform Delay, d1	36.0	35.9	35.9	40.0	14.5	48.2	14.5	40.2	40.2	40.2	40.2	40.2
Progression Factor	0.80	0.81	0.81	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	134.6	30.3	30.3	244.2	301.3	44.6	0.1	0.2	0.2	0.2	0.2	0.2
Delay (s)	163.5	59.2	59.2	284.2	315.8	92.8	14.6	45.2	45.2	45.2	45.2	45.2
Level of Service	F	E	E	F	F	F	B	B	B	B	B	B
Approach Delay (s)	142.5	59.2	59.2	284.2	315.8	92.8	14.6	45.2	45.2	45.2	45.2	45.2
Approach LOS	F	E	E	F	F	F	B	B	B	B	B	B
Intersection Summary												
HCM Average Control Delay	227.8											
HCM Volume to Capacity ratio	1.52											
Actuated Cycle Length (s)	120.0											
Intersection Capacity Utilization	196.9%											
Analysis Period (min)	15											
f Phase conflict between lane groups												
c Critical Lane Group												



HCM Signalized Intersection Capacity Analysis  
11: Republican St & 5th Ave

HCM Signalized Intersection Capacity Analysis  
12: Harrison St & 5th Ave

2025 With Alt 2 - AM Peak Hour  
500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	11	11	11	11	12	11	11	12
Total Lost time (s)												
Lane Util. Factor												
Frpb, ped/bikes												
Flpb, ped/bikes												
Flt												
Flt Protected												
Satd. Flow (prot)												
Flt Permitted												
Satd. Flow (perm)												
Volume (vph)	0	0	0	35	5	18	15	838	473	59	340	5
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	0	0	0	36	5	18	15	855	483	60	347	5
RTOR Reduction (vph)	0	0	0	0	0	0	15	0	73	0	0	1
Lane Group Flow (vph)	0	0	0	0	0	41	3	15	1265	0	60	351
Conf. Peds. (#/hr)	10		20	20		10	75		20	20		75
Heavy Vehicles (%)	0%	0%	0%	33%	33%	33%	7%	7%	7%	7%	7%	7%
Parking (#/hr)	8											
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases	6			6			8			4		
Permitted Phases	6			6			8			4		
Actuated Green, G (s)	20.0			20.0			109.0			109.0		
Effective Green, g (s)	22.0			22.0			112.0			112.0		
Actuated g/C Ratio	0.16			0.16			0.80			0.80		
Clearance Time (s)	5.0			5.0			6.0			6.0		
Vehicle Extension (s)	3.0			3.0			3.0			3.0		
Lane Grp Cap (vph)	190			170			559			3450		
v/s Ratio Prot	0.03			0.00			0.02			0.20		
v/s Ratio Perm	0.22			0.02			0.03			0.37		
Uniform Delay, d1	51.5			49.9			2.9			4.0		
Progression Factor	1.00			1.00			1.45			1.39		
Incremental Delay, d2	0.6			0.0			0.1			0.2		
Delay (s)	52.0			49.9			4.2			5.7		
Level of Service	D			D			A			A		
Approach Delay (s)	0.0			51.4			5.7			6.2		
Approach LOS	A			D			A			A		
Intersection Summary												
HCM Average Control Delay	7.3			HCM Level of Service								
HCM Volume to Capacity ratio	0.34			A								
Actuated Cycle Length (s)	140.0			Sum of lost time (s)								
Intersection Capacity Utilization	59.7%			ICU Level of Service								
Analysis Period (min)	15			B								
Critical Lane Group												

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	12	12	12	12	12	12	12	12	12	12	12	12
Lane Width	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Total Lost time (s)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Util. Factor	1.00	0.87	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	0.78	1.00	0.93	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	0.92	1.00	0.85	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt	0.95	1.00	0.96	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	1687	1421	1363	2720	1359	2928	1359	2928	1359	2928	1359	2928
Satd. Flow (prot)	0.69	1.00	0.79	1.00	0.49	1.00	0.49	1.00	0.49	1.00	0.49	1.00
Flt Permitted	1222	1421	1120	2720	695	2928	695	2928	695	2928	695	2928
Satd. Flow (perm)	5	5	5	55	10	599	10	599	10	599	10	599
Volume (vph)	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Peak-hour factor, PHF	5	5	5	60	11	658	11	658	11	658	11	658
Adj. Flow (vph)	0	4	0	0	0	0	0	0	0	0	0	0
RTOR Reduction (vph)	0	4	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	5	6	0	0	71	658	11	772	0	0	428	0
Confl. Peds. (#/hr)	100	100	100	100	185	185	115	115	115	115	185	185
Heavy Vehicles (%)	7%	7%	7%	1%	1%	1%	19%	19%	19%	8%	8%	8%
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	2	2	2	6	6	6	8	8	8	8	8	8
Permitted Phases	2	2	2	6	6	6	8	8	8	8	8	8
Actuated Green, G (s)	36.7	36.7	36.7	36.7	36.7	36.7	93.3	93.3	93.3	93.3	93.3	93.3
Effective Green, g (s)	37.7	37.7	37.7	37.7	37.7	37.7	96.3	96.3	96.3	96.3	96.3	96.3
Actuated g/C Ratio	0.27	0.27	0.27	0.27	0.27	0.27	0.69	0.69	0.69	0.69	0.69	0.69
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	329	383	302	732	478	2014	2098	2098	2098	2098	2098	2098
v/s Ratio Prot	0.00	0.00	0.00	0.24	0.24	0.24	0.26	0.26	0.26	0.26	0.26	0.26
v/s Ratio Perm	0.00	0.02	0.02	0.24	0.24	0.24	0.38	0.38	0.38	0.38	0.38	0.38
Uniform Delay, d1	37.5	37.5	37.5	39.9	39.9	39.9	9.3	9.3	9.3	9.3	9.3	9.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.32	0.32	0.32	0.32	0.32	0.32
Incremental Delay, d2	0.0	0.0	0.0	0.4	0.4	0.4	0.5	0.5	0.5	0.5	0.5	0.5
Delay (s)	37.5	37.6	40.3	63.1	2.3	3.2	3.2	3.2	3.2	3.2	3.2	3.2
Level of Service	D	D	D	D	D	D	E	E	E	E	E	E
Approach Delay (s)	37.6	37.6	37.6	60.9	60.9	60.9	3.2	3.2	3.2	3.2	3.2	3.2
Approach LOS	D	D	D	E	E	E	A	A	A	A	A	A
Intersection Summary												
HCM Average Control Delay	25.0 HCM Level of Service C											
HCM Volume to Capacity ratio	0.53											
Actuated Cycle Length (s)	140.0											
Intersection Capacity Utilization	63.5% ICU Level of Service B											
Analysis Period (min)	15											
c Critical Lane Group												

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The Transpo Group 1/17/06

# HCM Unsignalized Intersection Capacity Analysis 13: Harrison St & Broad St

# HCM Signalized Intersection Capacity Analysis 14: 5th Ave & Broad St

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Grade	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Volume (veh/h)	0	0	5	0	0	0	0	340	5	0	1330	851
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Hourly flow rate (vph)	0	0	6	0	0	0	0	382	6	0	1494	956
Pedestrians	20											
Lane Width (ft)	11.0											
Walking Speed (ft/s)	4.0											
Percent Blockage	2											
Right turn flare (veh)												
Median type	None											
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	2183	2380	1245	1132	2855	194	2471					388
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	2183	2380	1245	1132	2855	194	2471					388
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1					4.1
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2					2.2
p0 queue free %	100	100	97	100	100	100	100					100
cM capacity (veh/h)	26	34	166	153	17	821	184					1167
Direction, Lane #	EB1	WB1	NE1	NE2	SW1	SW2						
Volume Total	6	0	255	133	996	1454						
Volume Left	0	0	0	0	0	0						
Volume Right	6	0	0	6	0	956						
cSH	166	1700	1700	1700	1700	1700						
Volume to Capacity	0.03	0.00	0.15	0.08	0.59	0.86						
Queue Length 95th (ft)	3	0	0	0	0	0						
Control Delay (s)	27.5	0.0	0.0	0.0	0.0	0.0						
Lane LOS	D	A										
Approach Delay (s)	27.5	0.0	0.0	0.0	0.0							
Approach LOS	D	A										
Intersection Summary												
Average Delay			0.1									
Intersection Capacity Utilization			74.8%									
Analysis Period (min)			15									

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The Transpo Group 1/17/06

Movement	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	12	12	11	11	11	11	12	11	11	12
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	3181	3298	1150	1586	3172	1631	3255					
Flt Permitted	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (perm)	3181	3298	1150	1586	3172	1631	3255					
Volume (vph)	0	492	35	0	367	93	221	310	0	105	1185	5
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	0	497	35	0	371	94	223	313	0	106	1197	5
RTOR Reduction (vph)	0	4	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	528	0	0	371	94	223	313	0	106	1202	0
Conf. Peds. (#/hr)	115	85	85	115	130	45	45	130	45	45	130	130
Heavy Vehicles (%)	3%	3%	3%	2%	2%	10%	10%	10%	10%	7%	7%	7%
Bus Blockages (#/hr)	0	20	0	0	18	0	0	0	0	0	0	0
Turn Type												
Protected Phases		8		4		5		2		1		6
Permitted Phases						4						
Actuated Green, G (s)		43.0		43.0		43.0		47.0		39.0		47.0
Effective Green, g (s)		49.0		49.0		49.0		50.0		32.0		50.0
Actuated g/C Ratio		0.35		0.35		0.23		0.36		0.23		0.36
Clearance Time (s)		9.0		9.0		6.0		6.0		6.0		6.0
Lane Grp Cap (vph)		1113		1154		403		383		1133		373
v/s Ratio Prot		c0.17		0.11		c0.14		0.10		0.07		c0.37
v/c Ratio Perm		0.47		0.32		0.23		0.61		0.28		1.03
Uniform Delay, d1		35.5		33.3		32.2		48.5		32.1		44.6
Progression Factor		1.04		0.99		0.99		0.97		0.92		1.00
Incremental Delay, d2		1.4		0.7		1.3		7.6		0.6		1.9
Delay (s)		38.3		33.7		33.1		54.7		30.2		46.5
Level of Service		D		C		C		D		C		F
Approach Delay (s)		38.3		33.6		33.6		40.4		33.6		77.7
Approach LOS		D		C		C		D		C		E
Intersection Summary												
HCM Average Control Delay				56.0								E
HCM Volume to Capacity ratio				0.72								
Actuated Cycle Length (s)				140.0								9.0
Intersection Capacity Utilization				71.9%								C
Analysis Period (min)				15								
c Critical Lane Group												

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The Transpo Group 1/17/06



HCM Signalized Intersection Capacity Analysis  
15: Denny Way & 1st Avenue

2025 With Alt 2 - AM Peak Hour  
500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SBL	SBR	NWL	NWR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Frnt. ped/bikes	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Flt. Protected	3445	3445	3445	3445	3445	3445	3445	3445	3445	3445
Satd. Flow (prot)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt. Permitted	3445	3445	3445	3445	3445	3445	3445	3445	3445	3445
Satd. Flow (perm)	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Volume (vph)	0.2149	0.275	0.1039	0.345	0.0	0.170	0.10	0.170	0.10	0.170
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	0.2215	0.284	0.1071	0.356	0.0	0.175	0.10	0.175	0.10	0.175
RTOR Reduction (vph)	0.10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane Group Flow (vph)	0.2489	0.0	0.1367	0.0	0.0	0.175	0.10	0.175	0.10	0.175
Heavy Vehicles (%)	3%	3%	4%	4%	0%	0%	11%	0%	11%	11%
Parking (#/hr)	0	0	0	0	0	0	0	0	0	0
Turn Type	1	1	1	1	1	1	1	1	1	1
Protected Phases	1	1	1	1	1	1	1	1	1	1
Permitted Phases	1	1	1	1	1	1	1	1	1	1
Actuated Green, G (s)	89.0	89.0	89.0	89.0	89.0	89.0	89.0	89.0	89.0	89.0
Effective Green, g (s)	71.0	71.0	71.0	71.0	71.0	71.0	71.0	71.0	71.0	71.0
Actualized g/C Ratio	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lane Grp Cap (vph)	2446	3409	337	273	337	273	337	273	337	273
v/s Ratio Prot	c0.72	0.28	0.40	0.52	0.04	0.01	0.01	0.01	0.01	0.01
v/s Ratio Perm	1.02	0.40	0.40	0.52	0.04	0.01	0.01	0.01	0.01	0.01
Uniform Delay, d1	14.5	5.9	33.7	29.9	33.7	29.9	33.7	29.9	33.7	29.9
Progression Factor	1.00	1.13	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Incremental Delay, d2	22.7	6.8	37.2	30.1	37.2	30.1	37.2	30.1	37.2	30.1
Delay (s)	37.2	6.8	37.2	30.1	37.2	30.1	37.2	30.1	37.2	30.1
Level of Service	D	A	A	A	A	A	A	A	A	A
Approach Delay (s)	37.2	6.8	37.2	30.1	37.2	30.1	37.2	30.1	37.2	30.1
Approach LOS	D	A	A	A	A	A	A	A	A	A
Intersection Summary										
HCM Average Control Delay	26.8									
HCM Volume to Capacity ratio	0.90									
Actuated Cycle Length (s)	100.0									
Intersection Capacity Utilization	90.7%									
Analysis Period (min)	15									
c Critical Lane Group										

HCM Signalized Intersection Capacity Analysis  
16: Denny Way & Broad St

2025 With Alt 2 - AM Peak Hour  
500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NER	NWL	NWR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	12	12	11	12	12	10	12	10
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Frnt. ped/bikes	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Flt. ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt. Protected	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	3359	3359	3359	3359	3359	3359	3359	3359	3359	3359
Flt. Permitted	3359	3359	3359	3359	3359	3359	3359	3359	3359	3359
Satd. Flow (perm)	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Volume (vph)	0.1230	0.1230	0.1230	0.1230	0.1230	0.1230	0.1230	0.1230	0.1230	0.1230
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0.1295	0.1295	0.1295	0.1295	0.1295	0.1295	0.1295	0.1295	0.1295	0.1295
RTOR Reduction (vph)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane Group Flow (vph)	0.1300	0.0	0.1147	0.0	0.0	0.1147	0.0	0.1147	0.0	0.1147
Conf. Peds. (#/hr)	22	12	12	12	12	12	12	12	12	12
Heavy Vehicles (%)	3%	3%	4%	4%	4%	4%	5%	5%	5%	5%
Bus Blockages (#/hr)	0	4	0	0	0	0	0	0	0	0
Turn Type	1	1	1	1	1	1	1	1	1	1
Protected Phases	1	1	1	1	1	1	1	1	1	1
Permitted Phases	1	1	1	1	1	1	1	1	1	1
Actuated Green, G (s)	53.0	53.0	53.0	53.0	53.0	53.0	53.0	53.0	53.0	53.0
Effective Green, g (s)	55.0	55.0	55.0	55.0	55.0	55.0	55.0	55.0	55.0	55.0
Actualized g/C Ratio	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lane Grp Cap (vph)	1847	1847	1847	1847	1847	1847	1847	1847	1847	1847
v/s Ratio Prot	c0.39	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37
v/s Ratio Perm	0.70	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67
Uniform Delay, d1	16.5	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0
Progression Factor	0.58	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Incremental Delay, d2	0.2	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Delay (s)	9.7	16.4	16.4	16.4	16.4	16.4	16.4	16.4	16.4	16.4
Level of Service	A	B	B	B	B	B	B	B	B	B
Approach Delay (s)	9.7	16.4	16.4	16.4	16.4	16.4	16.4	16.4	16.4	16.4
Approach LOS	A	B	B	B	B	B	B	B	B	B
Intersection Summary										
HCM Average Control Delay	26.2									
HCM Volume to Capacity ratio	0.85									
Actuated Cycle Length (s)	100.0									
Intersection Capacity Utilization	73.8%									
Analysis Period (min)	15									
c Critical Lane Group										

HCM Signalized Intersection Capacity Analysis  
 17: Denny Way & 5th Ave

2025 With Alt 2 - AM Peak Hour  
 500 Fifth Avenue North

Movement	EBL	EBT	EBR	EBR2	WBT	WBR	NBL	NBT	NBR	NBR2	SBL2	SBL
Lane Configurations	4T											
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	12	12	10	12	12	10	12	12	11	12
Total Lost time (s)	3.0											
Lane Util. Factor	0.95											
Flpb, ped/bikes	0.99											
Flpb, ped/bikes	1.00											
Flt	0.95											
Flt Protected	1.00											
Satd. Flow (prot)	3023											
Flt Permitted	0.95											
Satd. Flow (perm)	3020											
Volume (vph)	5	795	405	10	830	412	5	65	15	15	76	218
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	5	837	426	11	874	434	5	68	16	16	80	229
RTOR Reduction (vph)	0	0	0	0	51	0	0	15	0	0	0	0
Lane Group Flow (vph)	0	1279	0	0	1257	0	0	90	0	0	0	309
Confli. Peds. (#/hr)	23	8	8	8	23	17	23	8	8	8	8	309
Heavy Vehicles (%)	2%	2%	2%	2%	4%	4%	8%	8%	8%	8%	3%	3%
Bus Blockages (#/hr)	0	4	0	0	2	0	0	11	0	0	0	0
Turn Type	Perm	Perm	Perm	Perm	Split	Split	Split	Split	Split	Split	Split	Split
Protected Phases	1	1	1	1	3	3	3	3	3	3	3	3
Permitted Phases	1	1	1	1	3	3	3	3	3	3	3	3
Actuated Green, G (s)	58.4	58.4	58.4	58.4	7.2	7.2	7.2	7.2	7.2	7.2	7.2	19.4
Effective Green, g (s)	60.4	60.4	60.4	60.4	9.2	9.2	9.2	9.2	9.2	9.2	9.2	21.4
Actuated g/C Ratio	0.60	0.60	0.60	0.60	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.21
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1824	1824	1824	1824	267	267	267	267	267	267	267	375
v/s Ratio Prot	c0.42	c0.42	c0.42	c0.42	c0.03	c0.03	c0.03	c0.03	c0.03	c0.03	c0.03	c0.18
v/s Ratio Perm	0.70	0.70	0.70	0.70	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.82
Uniform Delay, d1	13.6	13.6	13.6	13.4	42.5	42.5	42.5	42.5	42.5	42.5	42.5	37.5
Progression Factor	0.20	0.20	0.20	0.87	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.1	2.1	2.1	2.1	0.8	0.8	0.8	0.8	0.8	0.8	0.8	13.6
Delay (s)	4.8	4.8	4.8	13.8	43.3	43.3	43.3	43.3	43.3	43.3	43.3	51.2
Level of Service	A	A	A	B	D	D	D	D	D	D	D	D
Approach Delay (s)	4.8	4.8	4.8	13.8	43.3	43.3	43.3	43.3	43.3	43.3	43.3	51.2
Approach LOS	A	A	A	B	D	D	D	D	D	D	D	D
Intersection Summary												
HCM Average Control Delay	15.6											
HCM Volume to Capacity ratio	0.69											
Actuated Cycle Length (s)	100.0											
Intersection Capacity Utilization	68.8%											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis  
 17: Denny Way & 5th Ave

2025 With Alt 2 - AM Peak Hour  
 500 Fifth Avenue North

Movement	SBT	SBR	
Lane Configurations	1	1	
Ideal Flow (vphpl)	1900	1900	
Lane Width	13	12	
Total Lost time (s)	3.0		
Lane Util. Factor	1.00		
Flpb, ped/bikes	0.99		
Flpb, ped/bikes	1.00		
Flt	0.98		
Flt Protected	1.00		
Satd. Flow (prot)	1860		
Flt Permitted	1.00		
Satd. Flow (perm)	1860		
Volume (vph)	105	15	
Peak-hour factor, PHF	0.95	0.95	
Adj. Flow (vph)	111	16	
RTOR Reduction (vph)	6	0	
Lane Group Flow (vph)	121	0	
Conf. Peds. (#/hr)		17	
Heavy Vehicles (%)	3%	3%	
Bus Blockages (#/hr)	0	0	
Turn Type	Prot		
Protected Phases		2	
Permitted Phases			
Actuated Green, G (s)	19.4		
Effective Green, g (s)	21.4		
Actuated g/C Ratio	0.21		
Clearance Time (s)	5.0		
Vehicle Extension (s)	3.0		
Lane Grp Cap (vph)	398		
v/s Ratio Prot	0.07		
v/s Ratio Perm			
v/c Ratio	0.31		
Uniform Delay, d1	33.0		
Progression Factor	1.00		
Incremental Delay, d2	0.4		
Delay (s)	33.5		
Level of Service	C		
Approach Delay (s)	46.0		
Approach LOS	D		
Intersection Summary			

Movement	EBT	EBR	EBR2	WBT	WBR	NBT	NBR	NBR2	SBL2	SBL	SBT	SBR
Lane Configurations	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	11	12	12	12	12	12	12	12	12
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Flt	0.98	0.98	0.98	0.98	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Flt Protected	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	3019	2966	2966	3091	3091	3091	3091	3091	3091	3091	3091	3091
Flt Permitted	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (perm)	3019	2966	2966	3091	3091	3091	3091	3091	3091	3091	3091	3091
Volume (vph)	1041	150	5	1193	160	325	75	5	385	185	0	895
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	1096	158	5	1256	168	342	79	5	405	195	0	942
RTOR Reduction (vph)	0	0	0	10	0	0	0	0	0	0	0	1
Lane Group Flow (vph)	1259	0	0	1414	0	426	0	0	600	479	478	0
Heavy Vehicles (%)	2%	2%	2%	4%	4%	2%	2%	2%	3%	3%	3%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	4	0
Turn Type	Protected Phases	2	2	2	4	4	3	3	3	3	8	8
Permitted Phases	Actuated Green, G (s)	28.3	28.3	17.7	17.7	35.0	57.7	57.7	37.0	59.7	59.7	37.0
Effective Green, g (s)	34.3	34.3	34.3	19.7	19.7	0.37	0.60	0.60	0.37	0.60	0.60	0.37
Actuated g/C Ratio	0.34	0.34	0.34	0.20	0.20	0.37	0.60	0.60	0.37	0.60	0.60	0.37
Clearance Time (s)	9.0	9.0	9.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1036	1017	609	609	583	787	801	583	787	801	583	787
v/s Ratio Prot	0.42	c0.48	c0.14	c0.14	c0.38	0.36	0.36	c0.38	0.36	0.36	c0.38	0.36
v/s Ratio Perm	1.22	1.39	0.70	0.70	1.03	0.61	0.60	1.03	0.61	0.60	1.03	0.61
Uniform Delay, d1	32.8	32.8	37.4	37.4	31.5	12.8	12.6	31.5	12.8	12.6	31.5	12.8
Progression Factor	1.13	0.63	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	105.6	179.8	3.5	3.5	44.9	1.3	1.2	44.9	1.3	1.2	44.9	1.3
Delay (s)	142.9	200.5	40.9	40.9	76.4	14.1	13.8	76.4	14.1	13.8	76.4	14.1
Level of Service	F	F	D	D	E	B	B	E	B	B	E	B
Approach Delay (s)	142.9	200.5	40.9	40.9	76.4	14.1	13.8	76.4	14.1	13.8	76.4	14.1
Approach LOS	F	F	D	D	E	B	B	E	B	B	E	B
Intersection Summary												
HCM Average Control Delay	116.1 HCM Level of Service F											
HCM Volume to Capacity ratio	1.09											
Actuated Cycle Length (s)	100.0 Sum of lost time (s) 9.0											
Intersection Capacity Utilization	100.2% ICU Level of Service G											
Analysis Period (min)	15											
c Critical Lane Group												

Movement	SBR2
Lane Configurations	1900
Ideal Flow (vphpl)	12
Lane Width	12
Total Lost time (s)	
Lane Util. Factor	
Flt Protected	
Flt Permitted	
Satd. Flow (prot)	
Satd. Flow (perm)	
Volume (vph)	15
Peak-hour factor, PHF	0.95
Adj. Flow (vph)	16
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Heavy Vehicles (%)	3%
Bus Blockages (#/hr)	0
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	
Intersection Summary	

HCM Signalized Intersection Capacity Analysis  
19: Denny Way & Dexter Avenue

2025 With Alt 2 - AM Peak Hour  
500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4T	4T	4T	4T	4T	4T	4T	4T	4T	4T	4T	4T
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Fit Protected	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	3205	3153	3153	1354	2690	1593	3185	1425				
Fit Permitted	0.95	1.00	1.00	0.42	1.00	0.68	1.00	1.00				
Satd. Flow (perm)	2098	3153	601	2690	1140	3185	1425					
Volume (vph)	90	1326	5	0	1095	80	5	100	5	165	320	293
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	98	1441	5	0	1190	87	5	109	5	179	348	308
RTOR Reduction (vph)	0	0	0	0	4	0	0	4	0	0	0	209
Lane Group Flow (vph)	0	1544	0	0	1273	0	5	110	0	179	348	99
Heavy Vehicles (%)	1%	1%	1%	2%	2%	2%	2%	20%	20%	2%	2%	2%
Turn Type	pm-pt											
Protected Phases	2	5			1			Perm		Perm		Perm
Permitted Phases	5				3			3		3		3
Actuated Green, G (s)	56.3	48.3	21.7	21.7	21.7	21.7	21.7	21.7	21.7	21.7	21.7	21.7
Effective Green, g (s)	59.3	51.3	24.7	24.7	24.7	24.7	24.7	24.7	24.7	24.7	24.7	24.7
Actuated g/C Ratio	0.69	0.51	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1620	1617	148	664	282	787	352					
v/s Ratio Prot	c0.14	0.40			0.04			c0.16		0.07		0.07
v/s Ratio Perm	c0.52				0.03			0.63		0.44		0.28
v/c Ratio	0.95	0.79	0.03	0.17	0.03	0.17	0.03	0.33		0.18		0.30
Uniform Delay, d1	13.9	19.9	28.6	29.6	33.6	31.8	30.5					
Progression Factor	0.87	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00		1.00
Incremental Delay, d2	1.7	4.0	0.1	0.1	4.6	0.4	0.4					
Delay (s)	11.1	23.8	28.7	29.7	38.2	32.2	30.9					
Level of Service	B	C	C	C	D	C	C					
Approach Delay (s)	11.1	23.8			29.6					33.0		
Approach LOS	B	C			C					C		

Intersection Summary			
HCM Average Control Delay	20.8	HCM Level of Service	
HCM Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	
Intersection Capacity Utilization	107.1%	ICU Level of Service	
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis  
20: Denny Way & Westlake Ave

2025 With Alt 2 - AM Peak Hour  
500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4T	4T	4T	4T	4T	4T	4T	4T	4T	4T	4T	4T
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Fit Protected	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	3059	2966	2966	1824	3204							
Fit Permitted	1.00	1.00	1.00	0.95	0.33	1.00						
Satd. Flow (perm)	3059	2966	2966	2704	568	3204						
Volume (vph)	0	1471	65	0	1135	155	5	335	95	130	150	15
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	1532	68	0	1182	161	5	349	99	135	156	16
RTOR Reduction (vph)	0	3	0	0	9	0	0	27	0	0	8	0
Lane Group Flow (vph)	0	1597	0	0	1334	0	0	426	0	135	164	0
Heavy Vehicles (%)	2%	2%	2%	4%	4%	4%	7%	7%	7%	0%	0%	0%
Turn Type												
Protected Phases	1				1			2				2
Permitted Phases								2				
Actuated Green, G (s)	66.2				66.2			23.8				23.8
Effective Green, g (s)	68.2				68.2			25.8				25.8
Actuated g/C Ratio	0.68				0.68			0.26				0.26
Clearance Time (s)	5.0				5.0			5.0				5.0
Vehicle Extension (s)	3.0				3.0			3.0				3.0
Lane Grp Cap (vph)	2086				2023			698				827
v/s Ratio Prot	c0.52				0.45			0.16				c0.24
v/c Ratio	0.77				0.66			0.61				0.92
Uniform Delay, d1	10.6				9.2			32.7				29.0
Progression Factor	1.00				1.00			1.18				1.00
Incremental Delay, d2	2.7				1.7			1.5				0.1
Delay (s)	13.3				10.9			40.0				29.1
Level of Service	B				B			D				F
Approach Delay (s)	13.3				10.9			40.0				54.2
Approach LOS	B				B			D				D

Intersection Summary			
HCM Average Control Delay	19.1	HCM Level of Service	
HCM Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	
Intersection Capacity Utilization	79.3%	ICU Level of Service	
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis  
 21: Denny Way & Fairview Ave  
 2025 With Alt 2 - AM Peak Hour  
 500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	12	11	11	12	9	10	12	10	10	12
Total Lost time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		0.97	0.95		1.00	0.95	
Flt Protected	1.00	1.00		1.00	0.98		1.00	0.98		1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1555	3099		1540	3009		2781	2901		1458	2771	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1555	3099		1540	3009		2781	2901		1458	2771	
Volume (vph)	165	842	20	45	1001	180	409	335	65	115	365	180
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	176	896	21	48	1065	191	435	356	69	122	388	191
RTOR Reduction (vph)	0	1	0	0	15	0	0	17	0	0	63	0
Lane Group Flow (vph)	176	916	0	48	1241	0	435	408	0	122	516	0
Heavy Vehicles (%)	1%	1%	1%	2%	2%	2%	2%	2%	2%	4%	4%	4%
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	1	6		5	2		3	8		7		4
Permitted Phases												
Actuated Green, G (s)	12.2	37.9		5.3	31.0		15.0	27.8		9.0	21.8	
Effective Green, g (s)	14.2	39.9		7.3	33.0		17.0	29.8		11.0	23.8	
Actuated g/C Ratio	0.14	0.40		0.07	0.33		0.17	0.30		0.11	0.24	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	221	1237		112	993		473	864		160	659	
v/s Ratio Prot	c0.11	0.30		0.03	c0.41		c0.16	0.14		0.08	c0.19	
v/s Ratio Perm												
v/c Ratio	0.80	0.74		0.43	1.25		0.92	0.47		0.76	0.78	
Uniform Delay, d1	41.5	25.6		44.4	33.5		40.8	28.7		43.2	35.7	
Progression Factor	1.00	1.00		1.13	0.98		1.00	1.00		1.09	0.79	
Incremental Delay, d2	17.8	4.0		1.6	117.9		22.8	0.4		17.8	5.6	
Delay (s)	59.3	29.6		51.9	150.7		63.7	29.1		64.9	33.8	
Level of Service	E	C		D	F		E	C		E	C	
Approach Delay (s)		34.4			147.1			46.6			39.3	
Approach LOS		C			F			D			D	
Intersection Summary												
HCM Average Control Delay	75.0						HCM Level of Service					
HCM Volume to Capacity ratio	0.99						E					
Actuated Cycle Length (s)	100.0						Sum of lost time (s)					
Intersection Capacity Utilization	91.2%						12.0					
Analysis Period (min)	15						F					
Critical Lane Group												

HCM Signalized Intersection Capacity Analysis  
 22: Denny Way & Stewart St  
 2025 With Alt 2 - AM Peak Hour  
 500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NBR	SBL	SBT	SWL	SWT	SWR	
Lane Configurations	↑↑			↑			↓↑↑								
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0							3.0		
Lane Util. Factor	0.95	1.00	1.00	1.00	1.00	1.00							0.86		
Flt Protected	1.00	0.95	1.00	0.95	1.00	1.00							0.99		
Satd. Flow (prot)	2961	1593	1676	1593	1676	1676							5519		
Flt Permitted	1.00	0.95	1.00	0.95	1.00	1.00							1.00		
Satd. Flow (perm)	2961	1593	1676	1593	1676	1676							5519		
Volume (vph)	0	539	288	605	1151	0	0	0	0	205	2150	185			
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	
Adj. Flow (vph)	0	561	300	630	1199	0	0	0	0	214	2240	193			
RTOR Reduction (vph)	0	26	0	0	0	0	0	0	0	0	12	0			
Lane Group Flow (vph)	0	835	0	630	1199	0	0	0	0	0	2635	0			
Heavy Vehicles (%)	4%	4%	4%	2%	2%	2%	0%	0%	0%	0%	5%	5%	5%	5%	
Turn Type	Prot			Prot			Prot			Split					
Protected Phases	3			2			2			1					
Permitted Phases										1					
Actuated Green, G (s)	20.5			29.5			54.5			36.5					
Effective Green, g (s)	22.0			31.0			56.0			38.0					
Actuated g/C Ratio	0.22			0.31			0.56			0.38					
Clearance Time (s)	4.5			4.5			4.5			4.5					
Vehicle Extension (s)	3.0			3.0			3.0			3.0					
Lane Grp Cap (vph)	651			494			939			2097					
v/s Ratio Prot	0.28			0.40			c0.72			c0.48					
v/s Ratio Perm															
v/c Ratio	1.28			1.28			1.28			1.26					
Uniform Delay, d1	39.0			34.5			22.0			31.0					
Progression Factor	0.98			1.00			1.00			0.86					
Incremental Delay, d2	138.2			136.9			132.9			119.1					
Delay (s)	176.3			173.4			154.9			145.9					
Level of Service	F			F			F			F					
Approach Delay (s)	176.3						161.3			0.0					
Approach LOS	F						F			A					
Intersection Summary															
HCM Average Control Delay	156.1						HCM Level of Service						F		
HCM Volume to Capacity ratio	1.27														
Actuated Cycle Length (s)	100.0						Sum of lost time (s)						6.0		
Intersection Capacity Utilization	115.6%						ICU Level of Service						H		
Analysis Period (min)	15														
c Critical Lane Group															



HCM Signalized Intersection Capacity Analysis 2025 With Alt 2 - AM Peak Hour  
23: Yale St & Stewart St 500 Fifth Avenue North

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt	1.00	0.85	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	1660	1411	1624	1710	1710	1710	1710	1710	1710	1710	1710	1710
Flt Permitted	1.00	1.00	0.35	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (perm)	1660	1411	606	1710	1710	1710	1710	1710	1710	1710	1710	1710
Volume (vph)	0	238	50	35	10	0	0	0	0	0	615	2140
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	0	243	51	36	10	0	0	0	0	0	628	2184
RTOR Reduction (vph)	0	0	13	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	243	38	36	10	0	0	0	0	0	628	2184
Heavy Vehicles (%)	3%	3%	3%	0%	0%	0%	0%	0%	0%	0%	4%	4%
Turn Type	3	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	3	3	3	3	3	3	3	3	3	3	3	3
Permitted Phases	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5
Actuated Green, G (s)	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0
Effective Green, g (s)	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22
Actuated g/C Ratio	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Clearance Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Vehicle Extension (s)	365	310	133	376	376	376	376	376	376	376	376	376
Lane Grp Cap (vph)	c0.15	0.03	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06
v/s Ratio Prot	0.67	0.12	0.27	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
v/s Ratio Perm	35.6	31.3	32.3	30.6	30.6	30.6	30.6	30.6	30.6	30.6	30.6	30.6
Uniform Delay, d1	0.99	1.10	0.34	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30
Progression Factor	3.9	0.2	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Incremental Delay, d2	39.0	34.6	12.0	9.1	9.1	9.1	9.1	9.1	9.1	9.1	9.1	9.1
Delay (s)	D	C	B	A	A	A	A	A	A	A	A	A
Level of Service	D	C	B	A	A	A	A	A	A	A	A	A
Approach Delay (s)	38.3			11.4			0.0				2.9	
Approach LOS	D			B			A				A	
Intersection Summary												
HCM Average Control Delay	6.3											
HCM Volume to Capacity ratio	0.67											
Actuated Cycle Length (s)	100.0											
Intersection Capacity Utilization	73.2%											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis 2025 With Alt 2 - AM Peak Hour  
24: Yale St & Howell St 500 Fifth Avenue North

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	1593	1334	1593	1334	1334	1334	1334	1334	1334	1334	1334	1334
Flt Permitted	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (perm)	1593	1334	1593	1334	1334	1334	1334	1334	1334	1334	1334	1334
Volume (vph)	15	803	30	0	0	0	0	0	0	205	480	0
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	17	934	35	0	0	0	0	0	0	238	558	0
RTOR Reduction (vph)	0	1	0	0	0	0	0	0	0	0	71	0
Lane Group Flow (vph)	17	968	0	0	0	0	0	0	0	285	487	0
Heavy Vehicles (%)	2%	2%	2%	0%	0%	0%	0%	0%	0%	16%	16%	1%
Parking (#/hr)	20											
Turn Type	Split	2	2							1	1	1
Protected Phases	2	2	2							1	1	1
Permitted Phases	53.0	53.0	53.0							37.0	37.0	37.0
Actuated Green, G (s)	55.0	55.0	55.0							39.0	39.0	39.0
Effective Green, g (s)	0.55	0.55	0.55							0.39	0.39	0.39
Actuated g/C Ratio	5.0	5.0	5.0							5.0	5.0	5.0
Clearance Time (s)	3.0	3.0	3.0							3.0	3.0	3.0
Vehicle Extension (s)	876	734	734							830	489	659
Lane Grp Cap (vph)	0.01	c0.73								0.13		0.27
v/s Ratio Prot	0.02	1.32								0.34	1.00	0.69
v/s Ratio Perm	10.2	22.5								21.5	30.4	25.4
Uniform Delay, d1	0.61	0.74								1.00	1.00	1.00
Progression Factor	0.0	151.6								1.1	39.8	5.8
Incremental Delay, d2	6.3	168.3								22.6	70.3	31.2
Delay (s)	A	F								C	E	C
Level of Service	A	F								C	E	C
Approach Delay (s)	165.5						0.0			54.1		31.2
Approach LOS	F						A			D		C
Intersection Summary												
HCM Average Control Delay	97.7											
HCM Volume to Capacity ratio	1.19											
Actuated Cycle Length (s)	100.0											
Intersection Capacity Utilization	93.6%											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis  
 25: Harrison St & Site Access

2025 With Alt 2 - AM Peak Hour  
 500 Fifth Avenue North

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↑	↑↑↑	↑↑↑			↑
Sign Control	Free	Free	Free		Stop	
Grade	0%	0%	0%		0%	
Volume (veh/h)	0	15	664	396	0	4
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	16	722	430	0	4
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage (veh)						
Upstream signal (ft)		155				
pX, platoon unblocked						
vC: conflicting volume	1152				953	456
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1152				953	456
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	99
cM capacity (veh/h)	602				257	552
Direction, Lane #	EB 1	WB 1	WB 2	WB 3	SB 1	SB 1
Volume Total	16	299	289	575	4	4
Volume Left	0	0	0	0	0	0
Volume Right	0	0	0	430	4	4
cSH	1700	1700	1700	1700	552	552
Volume to Capacity	0.01	0.17	0.17	0.34	0.01	0.01
Queue Length 95th (ft)	0	0	0	0	0	1
Control Delay (s)	0.0	0.0	0.0	0.0	11.6	11.6
Lane LOS					B	B
Approach Delay (s)	0.0	0.0			11.6	
Approach LOS					B	
Intersection Summary						
Average Delay	0.0					
Intersection Capacity Utilization	31.7%					
Analysis Period (min)	15					
				ICU Level of Service		A

HCM Unsignalized Intersection Capacity Analysis  
 26: Mercer St & Site Driveway

2025 With Alt 2 - AM Peak Hour  
 500 Fifth Avenue North

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↑					↑
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	1609	72	0	0	0	28
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	1788	80	0	0	0	31
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage (veh)						
Upstream signal (ft)	644				646	
pX, platoon unblocked						
vC, conflicting volume			1868		1828	487
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			1868		1828	487
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	94
cM capacity (veh/h)			319		68	526
Direction, Lane #	EB 1	EB 2	EB 3	EB 4	NB 1	
Volume Total	511	511	511	335	31	
Volume Left	0	0	0	0	0	
Volume Right	0	0	0	80	31	
cSH	1700	1700	1700	1700	526	
Volume to Capacity	0.30	0.30	0.30	0.20	0.06	
Queue Length 95th (ft)	0	0	0	0	5	
Control Delay (s)	0.0	0.0	0.0	0.0	12.3	
Lane LOS					B	
Approach Delay (s)	0.0				12.3	
Approach LOS					B	
Intersection Summary						
Average Delay	0.2					
Intersection Capacity Utilization	34.5%					
Analysis Period (min)	15					
				ICU Level of Service		
				A		



# HCM Signalized Intersection Capacity Analysis 1: Roy St & 5th Ave

2025 With Alt 2 - PM Peak Hour

500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	11	12	11	11	12	11	11	12
Total Lost time (s)				3.0				3.0	3.0			
Lane Util. Factor				1.00				0.95	0.95			
Flpb. ped/bikes				1.00				1.00	0.98			
Flpb. ped/bikes				0.98				1.00	1.00			
Flt				0.99				1.00	0.97			
Flt Protected				0.98				0.95	0.99			
Satd. Flow (prot)				1377				1641	1412			
Flt Permitted				0.98				0.95	0.99			
Satd. Flow (perm)				1377				1641	1412			
Volume (vph)	0	0	0	45	60	5	685	345	94	10	200	70
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	49	65	5	745	375	102	11	217	76
RTOR Reduction (vph)	0	0	0	0	2	0	0	10	0	0	15	0
Lane Group Flow (vph)	0	0	0	0	117	0	651	561	0	11	278	0
Confl. Peds. (#/hr)				20				20				20
Heavy Vehicles (%)	0%	0%	0%	2%	2%	2%	1%	1%	1%	6%	6%	6%
Parking (#/hr)				20				8				8
Turn Type	Perm											
Protected Phases	6											
Permitted Phases	6											
Actuated Green, G (s)				17.0				27.0	27.0			
Effective Green, g (s)				20.0				30.0	30.0			
Actuated g/C Ratio				0.25				0.38	0.38			
Clearance Time (s)				6.0				6.0	6.0			
Lane Grp Cap (vph)				344				615	530			
v/s Ratio Prot								0.40	c0.40			
v/s Ratio Perm				0.08								
v/c Ratio				0.34				1.06	1.06			
Uniform Delay, d1				24.6				25.0	25.0			
Progression Factor				1.00				0.19	0.19			
Incremental Delay, d2				2.7				30.5	31.0			
Delay (s)				27.3				35.3	35.8			
Level of Service				C				D	D			
Approach Delay (s)				0.0								
Approach LOS				A				C	C			
Intersection Summary												
HCM Average Control Delay				35.6				HCM Level of Service			D	
HCM Volume to Capacity ratio				0.76							9.0	
Actuated Cycle Length (s)				80.0							C	
Intersection Capacity Utilization				67.2%								
Analysis Period (min)				15								
c Critical Lane Group												

# HCM Signalized Intersection Capacity Analysis 2: Broad St & 9th Ave

2025 With Alt 2 - PM Peak Hour

500 Fifth Avenue North

Movement	EBT	EBR	WBL	WBT	WBR	SBL	SBT	SBR	SBR2
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	10	10	11	12	9	8	12
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	1.00	0.95	1.00	0.95	1.00	0.91	1.00	1.00
Flpb. ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb. ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt	0.93	1.00	0.99	1.00	0.99	1.00	0.85	1.00	0.85
Flt Protected	1.00	0.95	1.00	1.00	0.99	1.00	0.99	1.00	1.00
Sat'd. Flow (prot)	2930	1516	2997	2997	3847	1247	3847	1247	1247
Flt Permitted	1.00	0.23	1.00	1.00	0.99	1.00	0.99	1.00	1.00
Sat'd. Flow (perm)	2930	368	2997	2997	3847	1247	3847	1247	1247
Volume (vph)	365	295	190	1710	145	155	1035	230	5
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	376	304	196	1763	149	160	1067	237	5
RTOR Reduction (vph)	121	0	0	0	0	0	0	1	0
Lane Group Flow (vph)	559	0	196	1912	0	0	1227	241	0
Confl. Peds. (#/hr)			50			50			
Heavy Vehicles (%)	0%	0%	0%	0%	0%	1%	1%	1%	1%
Bus Blockages (#/hr)	0	0	0	0	0	0	2	0	0
Parking (#/hr)							20		
Turn Type			pm+pt			Split		Prot	
Protected Phases	1	2	1	2		3	3	3	3
Permitted Phases									
Actuated Green, G (s)	37.5	62.5	68.5	68.5		39.5	39.5	39.5	39.5
Effective Green, g (s)	40.5	68.5	71.5	71.5		42.5	42.5	42.5	42.5
Actuated g/C Ratio	0.34	0.57	0.60	0.60		0.35	0.35	0.35	0.35
Clearance Time (s)	6.0	6.0	6.0	6.0		6.0	6.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	989	478	1786	1786		1362	442	442	442
v/s Ratio Prot	0.19	0.10	c0.64	c0.64		c0.32	0.19		
v/s Ratio Perm		0.14							
v/c Ratio	0.57	0.41	1.07	1.07		0.90	0.55		
Uniform Delay, d1	32.5	26.4	24.2	24.2		36.8	31.0		
Progression Factor	1.00	0.29	0.24	0.24		1.00	1.00		
Incremental Delay, d2	2.3	0.1	33.1	33.1		8.5	1.4		
Delay (s)	34.9	7.6	38.9	38.9		45.2	32.4		
Level of Service	C	A	D	D		D	C		
Approach Delay (s)	34.9		36.0			43.1			
Approach LOS	C		D			D			
Intersection Summary									
HCM Average Control Delay	38.3				HCM Level of Service				D
HCM Volume to Capacity ratio	1.01								
Actuated Cycle Length (s)	120.0				Sum of lost time (s)				6.0
Intersection Capacity Utilization	90.0%				ICU Level of Service				E
Analysis Period (min)	15								
c Critical Lane Group									

HCM Signalized Intersection Capacity Analysis  
3: Broad St & Westlake Ave

2025 With Alt 2 - PM Peak Hour

500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4T	4T	4T	4T	4T	4T	4T	4T	4T	4T	4T	4T
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	12	12	10	12	12	10	12	12	12	12
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	1.00	0.95	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00
Frpb, ped/bikes	0.98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.96	1.00	1.00	1.00	1.00	1.00	1.00
Flt	0.97	1.00	1.00	1.00	0.85	1.00	0.94	1.00	1.00	1.00	1.00	1.00
Flt Protected	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	2962	1624	3032	1454	1548	2817	1624	1710				
Flt Permitted	0.73	0.40	1.00	1.00	0.37	1.00	0.10	1.00				
Satd. Flow (perm)	2165	681	3032	1454	595	2817	163	1710				
Volume (vph)	15	435	90	110	1925	1130	185	759	529	50	315	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	16	458	95	116	2026	1189	195	799	557	53	332	0
RTOR Reduction (vph)	0	14	0	0	0	20	0	105	0	0	0	0
Lane Group Flow (vph)	0	555	0	116	2026	1169	195	1251	0	53	332	0
Conf. Peds. (#/hr)							50					
Heavy Vehicles (%)	1%	1%	1%	0%	0%	0%	1%	1%	1%	0%	0%	0%
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	2	2	2	2	2	2	1	1	1	1	1	1
Permitted Phases	2	2	2	2	2	2	1	1	1	1	1	1
Actuated Green, G (s)	69.5	69.5	69.5	69.5	69.5	69.5	39.5	39.5	39.5	39.5	39.5	39.5
Effective Green, g (s)	72.0	72.0	72.0	72.0	72.0	72.0	42.0	42.0	42.0	42.0	42.0	42.0
Actuated g/C Ratio	0.60	0.60	0.60	0.60	0.60	0.60	0.35	0.35	0.35	0.35	0.35	0.35
Clearance Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1299	409	1819	872	208	986	57	599				
v/s Ratio Prot	0.26	0.17	0.17	0.80	0.33	0.44	0.33	0.19				
v/s Ratio Perm	0.43	0.28	1.11	1.34	0.94	1.27	0.93	0.55				
Uniform Delay, d1	12.9	11.6	24.0	24.0	37.7	39.0	37.6	31.5				
Progression Factor	0.61	0.85	0.71	0.70	0.49	0.40	1.00	1.00				
Incremental Delay, d2	0.2	0.3	56.9	158.2	8.9	121.6	100.2	3.7				
Delay (s)	8.0	10.1	74.0	175.1	27.4	137.3	137.8	35.1				
Level of Service	A	B	E	F	C	F	F	D				
Approach Delay (s)	8.0		107.9			123.5		49.3				
Approach LOS	A		F			F		D				
Intersection Summary												
HCM Average Control Delay	98.4						HCM Level of Service					
HCM Volume to Capacity ratio	1.31						F					
Actuated Cycle Length (s)	120.0						Sum of lost time (s)					
Intersection Capacity Utilization	147.6%						ICU Level of Service					
Analysis Period (min)	15						H					
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis  
4: Valley St & Fairview Ave

2025 With Alt 2 - PM Peak Hour

500 Fifth Avenue North

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↑	↑↑	↑↑↑	↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	10	12	12	12	12	12
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	1.00	1.00	0.95	0.94	1.00
Fit	1.00	0.85	1.00	1.00	1.00	0.85
Fit Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3002	1151	812	3217	4536	1439
Fit Permitted	1.00	1.00	0.15	1.00	0.95	1.00
Satd. Flow (perm)	3002	1151	130	3217	4536	1439
Volume (vph)	834	55	5	995	2045	390
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	851	56	5	1015	2087	398
RTOR Reduction (vph)	0	11	0	0	0	16
Lane Group Flow (vph)	851	45	5	1015	2087	382
Heavy Vehicles (%)	1%	1%	100%	1%	1%	1%
Parking (#/hr)	20					
Turn Type	Perm D+P p+ov					
Protected Phases	4	3	3	4	2	2
Permitted Phases	4					
Actuated Green, G (s)	40.0	40.0	49.0	54.0	56.0	70.0
Effective Green, g (s)	42.0	42.0	53.0	56.0	58.0	72.0
Actuated g/C Ratio	0.35	0.35	0.44	0.47	0.48	0.60
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1051	403	120	1501	2192	863
v/s Ratio Prot	c0.28	0.00	c0.32	c0.46	0.27	
v/s Ratio Perm	0.04					
v/c Ratio	0.81	0.11	0.04	0.68	0.95	0.44
Uniform Delay, d1	35.4	26.4	21.0	24.9	29.7	13.1
Progression Factor	1.23	1.40	1.00	1.00	1.02	1.02
Incremental Delay, d2	4.5	0.4	0.1	1.2	1.4	0.0
Delay (s)	47.9	37.3	21.2	26.2	31.5	13.3
Level of Service	D	D	C	C	C	B
Approach Delay (s)	47.3	26.1 28.6				
Approach LOS	D	C C				
Intersection Summary						
HCM Average Control Delay	31.9			HCM Level of Service		
HCM Volume to Capacity ratio	0.87			C		
Actuated Cycle Length (s)	120.0			Sum of lost time (s)		
Intersection Capacity Utilization	80.4%			ICU Level of Service		
Analysis Period (min)	15			D		
C Critical Lane Group						

HCM Signalized Intersection Capacity Analysis  
5: Mercer St & 1st Avenue

2025 With Alt 2 - PM Peak Hour  
500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4↑	4↑	4↑	4↑	4↑	4↑	4↑	4↑	4↑	4↑	4↑	4↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Friction Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	3525	3525	3525	3525	3525	3525	3525	3525	3525	3525	3525	3525
Fit Permitted	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (perm)	3525	3525	3525	3525	3525	3525	3525	3525	3525	3525	3525	3525
Volume (vph)	105	1200	0	0	0	0	160	445	350	0	0	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	111	1263	0	0	0	0	168	468	368	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	15	0	0	0	0
Lane Group Flow (vph)	0	1374	0	0	0	0	168	821	0	0	0	0
Heavy Vehicles (%)	2%	2%	2%	0%	0%	0%	4%	4%	4%	0%	0%	0%
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	1	1	1	1	1	1	1	1	1	1	1	1
Permitted Phases	1	2	2	2	2	2	2	2	2	2	2	2
Actuated Green, G (s)	36.0	36.0	36.0	36.0	36.0	36.0	36.0	36.0	36.0	36.0	36.0	36.0
Effective Green, g (s)	37.0	37.0	37.0	37.0	37.0	37.0	37.0	37.0	37.0	37.0	37.0	37.0
Actuated g/C Ratio	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Grp Cap (vph)	1630	803	1499	803	1499	803	1499	803	1499	803	1499	803
v/s Ratio Prot	0.39	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
v/s Ratio Perm	0.84	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21
Uniform Delay, d1	18.9	12.8	15.5	12.8	15.5	12.8	15.5	12.8	15.5	12.8	15.5	12.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	5.5	0.6	1.4	0.6	1.4	0.6	1.4	0.6	1.4	0.6	1.4	0.6
Delay (s)	24.4	13.4	16.9	13.4	16.9	13.4	16.9	13.4	16.9	13.4	16.9	13.4
Level of Service	C	B	B	B	B	B	B	B	B	B	B	B
Approach Delay (s)	24.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Approach LOS	C	A	A	A	A	A	A	A	A	A	A	A
Intersection Summary												
HCM Average Control Delay	21.0	HCM Level of Service	C									
HCM Volume-to-Capacity ratio	0.70											
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	6.0									
Intersection Capacity Utilization	66.4%	ICU Level of Service	C									
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis  
6: Mercer St & 5th Ave

2025 With Alt 2 - PM Peak Hour  
500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4↑	4↑	4↑	4↑	4↑	4↑	4↑	4↑	4↑	4↑	4↑	4↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.86	1.00	0.86	1.00	0.86	1.00	0.86	1.00	0.86	1.00	0.86	1.00
Friction Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	3525	3525	3525	3525	3525	3525	3525	3525	3525	3525	3525	3525
Fit Permitted	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (perm)	3525	3525	3525	3525	3525	3525	3525	3525	3525	3525	3525	3525
Volume (vph)	65	1349	176	0	0	0	0	1109	468	126	164	0
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	69	1435	187	0	0	0	0	1180	498	134	174	0
RTOR Reduction (vph)	0	0	58	0	0	0	0	0	164	0	0	0
Lane Group Flow (vph)	0	1504	129	0	0	0	0	1180	334	67	241	0
Conf. Peds. (#/hr)	30	35	35	30	35	35	30	35	35	30	35	35
Heavy Vehicles (%)	1%	1%	1%	0%	0%	0%	0%	1%	1%	4%	4%	4%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)	25	25	25	25	25	25	25	25	25	25	25	25
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	2	2	2	2	2	2	2	2	2	2	2	2
Permitted Phases	2	2	2	2	2	2	2	2	2	2	2	2
Actuated Green, G (s)	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0
Effective Green, g (s)	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0
Actuated g/C Ratio	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lane Grp Cap (vph)	1836	444	444	1156	484	405	1358	405	405	1358	405	1358
v/s Ratio Prot	0.26	0.09	0.09	0.26	0.09	0.09	0.26	0.09	0.09	0.09	0.09	0.09
v/s Ratio Perm	0.82	0.29	0.29	0.82	0.29	0.29	0.82	0.29	0.29	0.29	0.29	0.29
Uniform Delay, d1	25.4	20.8	20.8	25.4	20.8	20.8	25.4	20.8	20.8	20.8	20.8	20.8
Progression Factor	0.71	0.45	0.45	0.71	0.45	0.45	0.71	0.45	0.45	0.45	0.45	0.45
Incremental Delay, d2	2.8	1.1	1.1	2.8	1.1	1.1	2.8	1.1	1.1	1.1	1.1	1.1
Delay (s)	20.9	10.4	10.4	20.9	10.4	10.4	20.9	10.4	10.4	10.4	10.4	10.4
Level of Service	C	B	B	C	B	B	C	B	B	B	B	B
Approach Delay (s)	19.7	0.0	0.0	19.7	0.0	0.0	19.7	0.0	0.0	0.0	0.0	0.0
Approach LOS	B	A	A	B	A	A	B	A	A	A	A	A
Intersection Summary												
HCM Average Control Delay	30.4	HCM Level of Service	C									
HCM Volume-to-Capacity ratio	0.72											
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	6.0									
Intersection Capacity Utilization	80.6%	ICU Level of Service	D									
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis  
7: Mercer St & Dexter Avenue

HCM Signalized Intersection Capacity Analysis  
8: Mercer St & 9th Ave

2025 With Alt 2 - PM Peak Hour  
500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBR	NBT	NBR	SBT	NEL	NER	NER2
Lane Configurations	4111	1	1	1	1	1	1	1	1	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	10	11	10	12	12	12	12
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.86	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95
Flt Protected	0.99	1.00	1.00	1.00	1.00	0.95	1.00	0.99	1.00	1.00
Satd. Flow (prot)	5761	1479	3032	1405	1501	3217	1480	1381		
Flt Permitted	0.99	1.00	1.00	1.00	1.00	0.13	1.00	0.99	1.00	1.00
Satd. Flow (perm)	5761	1479	3032	1405	201	3217	1480	1381		
Volume (vph)	364	1999	55	110	515	175	310	475	30	345
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	409	2246	62	124	579	197	348	534	34	388
RTOR Reduction (vph)	0	0	0	65	0	6	0	0	0	2
Lane Group Flow (vph)	0	2717	0	59	579	191	348	534	233	198
Heavy Vehicles (%)	1%	1%	1%	0%	0%	0%	1%	1%	0%	0%
Turn Type	Perm	Perm	Perm	custom	Perm	pm-pt	Perm	Prot	Prot	Prot
Protected Phases	1	1	1	4	4	3	7	2	2	2
Permitted Phases	1	1	1	4	4	7				
Actuated Green, G (s)	64.0	64.0	26.0	26.0	44.0	44.0	44.0	14.0	14.0	14.0
Effective Green, g (s)	67.0	67.0	29.0	29.0	47.0	47.0	47.0	17.0	17.0	17.0
Actuated g/C Ratio	0.48	0.48	0.21	0.21	0.34	0.34	0.12	0.12	0.12	0.12
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lane Grp Cap (vph)	2757	708	628	291	207	1080	180	168		
v/s Ratio Prot	0.04	0.19	0.14	c0.18	0.17	c0.16	0.14			
v/s Ratio Perm	0.47	0.99	0.92	0.66	1.68	0.49	1.29	1.18		
Uniform Delay, d1	36.0	19.8	54.4	50.9	39.2	37.0	61.5	61.5		
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		
Incremental Delay, d2	14.1	0.2	21.1	11.0	326.7	1.6	167.3	126.1		
Delay (s)	50.1	20.1	75.5	61.9	365.8	38.7	228.8	187.6		
Level of Service	D	C	E	E	F	D	F	F		
Approach Delay (s)	50.1	72.1			167.7	209.8				
Approach LOS	D	E			F	F				
Intersection Summary										
HCM Average Control Delay	87.8									
HCM Volume to Capacity ratio	1.27									
Actuated Cycle Length (s)	140.0									
Intersection Capacity Utilization	103.9%									
Analysis Period (min)	15									
c Critical Lane Group										

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The Transpo Group 1/17/06

Movement	EBT	EBR	SBL	SBT	SBR	SER
Lane Configurations	1111	1	1	1	1	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	9	12	11
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.86	1.00	0.91	1.00	1.00	0.91
Flt Protected	1.00	1.00	0.88	0.94	1.00	0.94
Flt Permitted	1.00	1.00	1.00	0.95	0.98	1.00
Satd. Flow (prot)	5617	1288	2505			
Flt Permitted	1.00	0.95	0.98			
Satd. Flow (perm)	5617	1288	2505			
Volume (vph)	2494	40	705	315	90	0
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	2545	41	719	321	92	0
RTOR Reduction (vph)	2	0	1	1	0	0
Lane Group Flow (vph)	2584	0	367	763	0	0
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%
Bus Blockages (#/hr)	0	0	2	0	0	0
Turn Type	Perm	Perm	Perm	custom	custom	custom
Protected Phases	1	1	2			
Permitted Phases	1	1	2			
Actuated Green, G (s)	70.0	39.0	39.0			
Effective Green, g (s)	72.5	41.5	41.5			
Actuated g/C Ratio	0.60	0.35	0.35			
Clearance Time (s)	5.5	5.5	5.5			
Vehicle Extension (s)	3.0	3.0	3.0			
Lane Grp Cap (vph)	3394	445	866			
v/s Ratio Prot	c0.46					
v/s Ratio Perm		0.28	0.30			
Uniform Delay, d1	0.76	17.4	35.9			
Progression Factor	1.00	1.42	1.42			
Incremental Delay, d2	1.7	7.4	6.6			
Delay (s)	19.1	58.5	59.0			
Level of Service	B	E	E			
Approach Delay (s)	19.1	58.9				
Approach LOS	B	E				
Intersection Summary						
HCM Average Control Delay	31.2					
HCM Volume to Capacity ratio	0.80					
Actuated Cycle Length (s)	120.0					
Intersection Capacity Utilization	71.3%					
Analysis Period (min)	15					
f Phase conflict between lane groups						
c Critical Lane Group						

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The Transpo Group 1/17/06

HCM Signalized Intersection Capacity Analysis  
9: Mercer St & Westlake Ave

2025 With Alt 2 - PM Peak Hour

500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4111											
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	12	12	12	12	12	11	12	12	12	12
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.86	0.86	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Flt Protected	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	5600	5600	5600	5600	5600	5600	5600	5600	5600	5600	5600	5600
Flt Permitted	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (perm)	5600	5600	5600	5600	5600	5600	5600	5600	5600	5600	5600	5600
Volume (vph)	293	2881	15	0	0	0	0	1215	705	310	125	0
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	296	2910	15	0	0	0	0	1227	712	313	126	0
RTOR Reduction (vph)	0	1	0	0	0	0	0	5	19	0	0	0
Lane Group Flow (vph)	0	3220	0	0	0	0	0	1326	599	313	126	0
Heavy Vehicles (%)	1%	1%	1%	0%	0%	0%	1%	1%	1%	0%	0%	0%
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Prot	Prot	Prot
Protected Phases	4	4	4	4	4	4	4	6	6	5	2	2
Permitted Phases	4	4	4	4	4	4	4	6	6	5	2	2
Actuated Green, G (s)	46.5	46.5	46.5	46.5	46.5	46.5	46.5	38.5	38.5	18.5	62.5	62.5
Effective Green, g (s)	49.0	49.0	49.0	49.0	49.0	49.0	49.0	41.0	41.0	21.0	65.0	65.0
Actuated g/C Ratio	0.41	0.41	0.41	0.41	0.41	0.41	0.41	0.34	0.34	0.18	0.54	0.54
Clearance Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	2287	2287	2287	2287	2287	2287	2287	1006	448	284	926	926
v/s Ratio Prot	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.45	0.45	0.19	0.07	0.07
v/s Ratio Perm	1.41	1.41	1.41	1.41	1.41	1.41	1.41	1.32	1.31	1.10	0.14	0.14
Uniform Delay, d1	35.5	35.5	35.5	35.5	35.5	35.5	35.5	39.5	39.5	49.5	13.6	13.6
Progression Factor	0.76	0.76	0.76	0.76	0.76	0.76	0.76	1.00	1.00	1.23	0.81	0.81
Incremental Delay, d2	185.3	185.3	185.3	185.3	185.3	185.3	185.3	150.0	156.4	80.8	0.3	0.3
Delay (s)	212.3	212.3	212.3	212.3	212.3	212.3	212.3	189.5	195.9	141.7	11.3	11.3
Level of Service	F	F	F	F	F	F	F	F	F	F	B	B
Approach Delay (s)	212.3	212.3	212.3	212.3	212.3	212.3	212.3	191.5	191.5	104.3	F	F
Approach LOS	F	F	F	F	F	F	F	F	F	F	F	F
Intersection Summary												
HCM Average Control Delay	196.6											
HCM Volume to Capacity ratio	1.32											
Actuated Cycle Length (s)	120.0											
Intersection Capacity Utilization	126.3%											
Analysis Period (min)	15											
c Critical Lane Group												

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The Transpo Group 1/17/06

HCM Signalized Intersection Capacity Analysis  
10: Mercer St & Fairview Ave

2025 With Alt 2 - PM Peak Hour

500 Fifth Avenue North

Movement	EBL	EBT	EBR	EBR2	WBL	WBR	NBT	NBR	NBR2	SBT
Lane Configurations	411	11	1	1	11	11	11	11	11	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	12	12	12	12	10	12	12	12
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.91	1.00	0.97	0.88	1.00	0.88	1.00	0.88	1.00	1.00
Flt	1.00	0.85	1.00	0.85	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	4512	1454	3120	2533	1596	2558	1613	1613	1613	1613
Flt Permitted	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (perm)	4512	1454	3120	2533	1596	2558	1613	1613	1613	1613
Volume (vph)	5	3851	355	75	470	2180	340	1480	15	70
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	5	3970	366	77	485	2247	351	1526	15	72
RTOR Reduction (vph)	0	0	6	0	0	47	0	1	0	0
Lane Group Flow (vph)	0	3975	437	0	485	2200	351	1540	0	72
Heavy Vehicles (%)	0%	0%	0%	0%	1%	1%	0%	0%	0%	6%
Turn Type	Split	Prot	Prot	Prot	Prot	Custom	pt+ov	pt+ov	pt+ov	pt+ov
Protected Phases	11	1	1	2	121	3	23	3	3	3
Permitted Phases	11	1	1	12	12	12	12	12	12	12
Actuated Green, G (s)	69.5	69.5	69.5	12.5	87.5	17.5	35.5	35.5	17.5	17.5
Effective Green, g (s)	72.0	72.0	72.0	15.0	90.0	24.0	42.0	42.0	24.0	24.0
Actuated g/C Ratio	0.60	0.60	0.60	0.12	0.75	0.20	0.35	0.35	0.20	0.20
Clearance Time (s)	5.5	5.5	5.5	5.5	5.5	9.5	9.5	9.5	9.5	9.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	2707	872	872	390	1900	319	895	895	323	323
v/s Ratio Prot	0.88	0.30	0.30	0.16	0.87	0.22	0.60	0.60	0.04	0.04
v/s Ratio Perm	1.47	0.50	0.50	1.24	1.16	1.10	1.72	1.72	0.22	0.22
Uniform Delay, d1	24.0	13.7	13.7	52.5	15.0	48.0	39.0	39.0	40.2	40.2
Progression Factor	0.51	0.46	0.46	1.00	1.00	1.00	1.00	1.00	0.66	0.66
Incremental Delay, d2	211.0	0.2	0.2	129.6	77.4	80.0	329.2	329.2	0.4	0.4
Delay (s)	223.1	6.5	6.5	182.1	92.4	128.0	368.2	368.2	27.0	27.0
Level of Service	F	A	A	F	F	F	F	F	C	C
Approach Delay (s)	201.4	201.4	201.4	323.7	323.7	323.7	323.7	323.7	27.0	27.0
Approach LOS	F	F	F	F	F	F	F	F	C	C
Intersection Summary										
HCM Average Control Delay	197.5									
HCM Volume to Capacity ratio	1.56									
Actuated Cycle Length (s)	120.0									
Intersection Capacity Utilization	197.4%									
Analysis Period (min)	15									
Phase conflict between lane groups:										
c Critical Lane Group										

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The Transpo Group 1/17/06



HCM Signalized Intersection Capacity Analysis  
11: Republican St & 5th Ave

HCM Signalized Intersection Capacity Analysis  
12: Harrison St & 5th Ave

2025 With Alt 2 - PM Peak Hour

2025 With Alt 2 - PM Peak Hour

500 Fifth Avenue North

500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Flpb, ped/bikes	1.00	0.98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	0.98	1.00	0.87	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	1.00	0.85	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	1623	1448	1486	1481	1674	3317						
Flt Permitted	0.95	1.00	0.52	1.00	0.11	1.00						
Satd. Flow (perm)	1623	1448	808	4881	192	3317						
Volume (vph)	0	0	0	363	5	166	20	1421	53	15	340	10
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	0	0	0	390	5	178	22	1528	57	16	366	11
RTOR Reduction (vph)	0	0	0	0	0	7	0	4	0	0	2	0
Lane Group Flow (vph)	0	0	0	395	171	22	1581	0	16	375	0	0
Conf. Peds. (#/hr)	10	20	20	10	75	20	20	20	20	20	75	75
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	2%	2%	4%	4%	4%
Parking (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	6	6	6	6	6	6	6	6	6	6	6	6
Permitted Phases	6	6	6	6	6	6	6	6	6	6	6	6
Actuated Green, G (s)	24.7	24.7	44.3	44.3	44.3	44.3	44.3	44.3	44.3	44.3	44.3	44.3
Effective Green, g (s)	26.7	26.7	47.3	47.3	47.3	47.3	47.3	47.3	47.3	47.3	47.3	47.3
Actuated g/C Ratio	0.33	0.33	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59
Clearance Time (s)	5.0	5.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	542	483	478	2886	114	1961						
v/s Ratio Prot	0.24	0.12	0.03	0.03	0.08	0.11						
v/s Ratio Perm	0.73	0.35	0.05	0.55	0.14	0.19						
Uniform Delay, d1	23.5	20.1	6.9	9.9	7.3	7.5						
Progression Factor	1.00	1.00	0.96	0.80	0.58	0.56						
Incremental Delay, d2	4.9	0.5	0.1	0.6	2.5	0.2						
Delay (s)	28.3	20.6	6.8	8.5	6.7	4.4						
Level of Service	C	C	C	A	A	A						
Approach Delay (s)	0.0	25.9	8.5	8.5	4.5	4.5						
Approach LOS	A	C	C	A	A	A						
Intersection Summary												
HCM Average Control Delay	11.8											
HCM Volume to Capacity ratio	0.61											
Actuated Cycle Length (s)	80.0											
Intersection Capacity Utilization	65.9%											
Analysis Period (min)	15											
c Critical Lane Group												

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The Transpo Group 1/17/06

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	0.91	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	0.95	1.00	0.94	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	1.00	0.85	1.00	0.85	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	1517	1241	1675	2748	1584	3335						
Flt Permitted	0.73	1.00	0.85	1.00	0.30	1.00						
Satd. Flow (perm)	1163	1241	1480	2748	495	3335						
Volume (vph)	15	0	30	30	10	829	30	650	15	5	673	10
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	16	0	33	33	11	911	33	714	16	5	740	11
RTOR Reduction (vph)	0	11	0	0	0	0	0	1	0	0	1	0
Lane Group Flow (vph)	16	22	0	0	44	911	33	729	0	0	755	0
Conf. Peds. (#/hr)	100	100	100	100	185	115	115	115	115	115	185	185
Heavy Vehicles (%)	19%	19%	19%	0%	0%	0%	4%	4%	4%	4%	4%	4%
Parking (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	2	2	2	2	2	2	2	2	2	2	2	2
Permitted Phases	2	2	2	2	2	2	2	2	2	2	2	2
Actuated Green, G (s)	31.1	31.1	31.1	31.1	31.1	31.1	31.1	31.1	31.1	31.1	31.1	31.1
Effective Green, g (s)	32.1	32.1	32.1	32.1	32.1	32.1	32.1	32.1	32.1	32.1	32.1	32.1
Actuated g/C Ratio	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	467	498	594	1103	259	1747						
v/s Ratio Prot	0.01	0.02	0.03	0.03	0.07	0.22						
v/s Ratio Perm	0.03	0.04	0.07	0.83	0.13	0.42						
Uniform Delay, d1	14.5	14.6	14.8	21.4	9.7	11.6						
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.49						
Incremental Delay, d2	0.0	0.0	0.1	5.2	0.4	0.3						
Delay (s)	14.6	14.6	14.8	26.6	14.8	17.5						
Level of Service	B	B	B	C	B	B						
Approach Delay (s)	14.6	14.6	26.1	26.1	17.4	11.8						
Approach LOS	B	B	C	C	B	B						
Intersection Summary												
HCM Average Control Delay	19.0											
HCM Volume to Capacity ratio	0.62											
Actuated Cycle Length (s)	80.0											
Intersection Capacity Utilization	70.7%											
Analysis Period (min)	15											
c Critical Lane Group												

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The Transpo Group 1/17/06





HCM Signalized Intersection Capacity Analysis  
 15: Denny Way & 1st Avenue  
 2025 With Alt 2 - PM Peak Hour  
 500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SBL	SBR	NWL	NWR
Lane Configurations	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Flt Protected	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	3356	4879	4879	4879	4879	4879	4879	4879	4879	4879
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	3176	4879	4879	3176	4879	4879	3176	4879	4879	4879
Volume (vph)	5	1325	375	0	1524	400	0	0	390	15
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	5	1410	399	0	1621	426	0	0	415	16
RTOR Reduction (vph)	0	26	0	0	47	0	0	0	0	0
Lane Group Flow (vph)	0	1788	0	0	2000	0	0	0	415	16
Heavy Vehicles (%)	4%	4%	4%	3%	3%	3%	0%	0%	5%	5%
Turn Type	1	1	1	1	1	1	1	1	1	1
Protected Phases	1	1	1	1	1	1	1	1	1	1
Permitted Phases	1	1	1	1	1	1	1	1	1	1
Actuated Green, G (s)	57.0	57.0	57.0	57.0	57.0	57.0	57.0	57.0	57.0	57.0
Effective Green, g (s)	59.0	59.0	59.0	59.0	59.0	59.0	59.0	59.0	59.0	59.0
Actuated g/C Ratio	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lane Grp Cap (vph)	1874	2879	2879	602	511	602	511	602	511	602
v/s Ratio Prot	0.41	0.41	0.41	0.41	0.41	0.41	0.41	0.41	0.41	0.41
v/s Ratio Perm	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56
v/c Ratio	6.33dr	6.33dr	6.33dr	0.69	0.69	0.69	0.69	0.69	0.69	0.69
Uniform Delay, d1	19.2	14.2	14.2	27.8	21.4	27.8	21.4	27.8	21.4	27.8
Progression Factor	1.00	0.42	0.42	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	12.5	0.7	0.7	6.3	6.3	6.3	6.3	6.3	6.3	6.3
Delay (s)	31.7	6.8	6.8	34.2	21.5	34.2	21.5	34.2	21.5	34.2
Level of Service	C	A	A	C	C	C	C	C	C	C
Approach Delay (s)	31.7	6.8	6.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Approach LOS	C	A	A	A	A	A	A	A	A	A
Intersection Summary										
HCM Average Control Delay	20.0	20.0	20.0	HCM Level of Service	C	HCM Level of Service	C	HCM Level of Service	C	HCM Level of Service
HCM Volume to Capacity ratio	0.86	0.86	0.86	Sum of lost time (s)	6.0	Sum of lost time (s)	6.0	Sum of lost time (s)	6.0	Sum of lost time (s)
Actuated Cycle Length (s)	100.0	100.0	100.0	ICU Level of Service	D	ICU Level of Service	D	ICU Level of Service	D	ICU Level of Service
Intersection Capacity Utilization	80.8%	80.8%	80.8%	Analysis Period (min)	15	Analysis Period (min)	15	Analysis Period (min)	15	Analysis Period (min)
Default Right Lane, Recode with 1 though lane as a right lane.										
Critical Lane Group										

HCM Signalized Intersection Capacity Analysis  
 16: Denny Way & Broad St  
 2025 With Alt 2 - PM Peak Hour  
 500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NER	NWL	NWR
Lane Configurations	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Flt Protected	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	3365	3292	3292	3292	3292	3292	3292	3292	3292	3292
Flt Permitted	0.88	1.00	1.00	0.88	1.00	1.00	0.88	1.00	1.00	1.00
Satd. Flow (perm)	2964	3292	3292	2964	3292	3292	2964	3292	3292	3292
Volume (vph)	15	855	0	0	1575	10	0	565	65	5
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	16	910	0	0	1676	11	0	601	69	5
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	928	0	0	1687	0	0	661	0	0
Conf. Peds. (#/hr)	22	12	12	12	22	18	34	34	18	18
Heavy Vehicles (%)	3%	3%	3%	1%	1%	1%	1%	1%	1%	1%
Bus Blockages (#/hr)	0	3	0	0	23	0	0	0	0	0
Turn Type	1	1	1	1	1	1	1	1	1	1
Protected Phases	1	1	1	1	1	1	1	1	1	1
Permitted Phases	1	1	1	1	1	1	1	1	1	1
Actuated Green, G (s)	58.0	58.0	58.0	58.0	58.0	58.0	58.0	58.0	58.0	58.0
Effective Green, g (s)	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0
Actuated g/C Ratio	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lane Grp Cap (vph)	1778	1975	1975	1108	1077	467	1077	467	1077	467
v/s Ratio Prot	0.31	0.51	0.51	0.20	0.20	0.20	0.20	0.20	0.20	0.20
v/s Ratio Perm	0.52	0.85	0.85	0.60	0.60	0.60	0.60	0.60	0.60	0.60
Uniform Delay, d1	11.6	16.4	16.4	27.3	26.9	29.7	26.9	29.7	26.9	29.7
Progression Factor	1.93	0.63	0.63	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1	4.6	4.6	2.4	2.4	2.4	2.4	2.4	2.4	2.4
Delay (s)	22.5	15.0	15.0	29.7	29.7	29.7	29.7	29.7	29.7	29.7
Level of Service	C	B	B	C	C	C	C	C	C	C
Approach Delay (s)	22.5	15.0	15.0	29.7	29.7	29.7	29.7	29.7	29.7	29.7
Approach LOS	C	B	B	C	C	C	C	C	C	C
Intersection Summary										
HCM Average Control Delay	23.4	23.4	23.4	HCM Level of Service	C	HCM Level of Service	C	HCM Level of Service	C	HCM Level of Service
HCM Volume to Capacity ratio	0.83	0.83	0.83	Sum of lost time (s)	6.0	Sum of lost time (s)	6.0	Sum of lost time (s)	6.0	Sum of lost time (s)
Actuated Cycle Length (s)	100.0	100.0	100.0	ICU Level of Service	D	ICU Level of Service	D	ICU Level of Service	D	ICU Level of Service
Intersection Capacity Utilization	74.5%	74.5%	74.5%	Analysis Period (min)	15	Analysis Period (min)	15	Analysis Period (min)	15	Analysis Period (min)
Default Right Lane, Recode with 1 though lane as a right lane.										
Critical Lane Group										

HCM Signalized Intersection Capacity Analysis  
 17: Denny Way & 5th Ave

HCM Signalized Intersection Capacity Analysis  
 17: Denny Way & 5th Ave

2025 With Alt 2 - PM Peak Hour

2025 With Alt 2 - PM Peak Hour

500 Fifth Avenue North

500 Fifth Avenue North

Movement	EBT	EBR	EBR2	WBT	WBR	NBT	NBR	NBR2	SBL2	SBL	SBT
Lane Configurations	1P	1P	1P	1P	1P	1P	1P	1P	1P	1P	1P
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	10	12	12	10	12	11	12	13
Total Lost time (s)	3.0		3.0	3.0		3.0		3.0		3.0	3.0
Lane Util. Factor	0.95		0.95	0.95		0.95		0.95		1.00	1.00
Flpb. ped/bikes	0.99		0.99	0.99		1.00		1.00		1.00	1.00
Flpb. ped/bikes	1.00		1.00	1.00		1.00		1.00		1.00	1.00
Flt	0.97		0.97	0.97		0.96		1.00		0.99	1.00
Flt Protected	1.00		1.00	1.00		1.00		1.00		0.95	1.00
Satd. Flow (prot)	3271		3202	3202		2953		1752		1876	1752
Flt Permitted	1.00		1.00	1.00		1.00		0.95		1.00	1.00
Satd. Flow (perm)	3271		3202	3202		2953		1752		1876	1752
Volume (vph)	820	195	15	910	185	5	160	40	10	115	239
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	872	207	16	968	197	5	170	43	11	122	254
RTOR Reduction (vph)	1	0	0	16	0	0	3	0	0	0	3
Lane Group Flow (vph)	1094	0	0	1149	0	0	226	0	0	376	130
Conf. Peds. (#/hr)			8		23	17					
Heavy Vehicles (%)	2%	2%	2%	1%	1%	6%	6%	6%	3%	3%	3%
Bus Blockages (#/hr)	3	0	0	4	0	0	18	0	0	0	0
Turn Type											
Protected Phases	1		1		3	3		2		2	
Permitted Phases											
Actuated Green, G (s)	49.3		49.3		12.4	12.4		23.3		23.3	
Effective Green, g (s)	51.3		51.3		14.4	14.4		25.3		25.3	
Actuated g/C Ratio	0.51		0.51		0.14	0.14		0.25		0.25	
Clearance Time (s)	5.0		5.0		5.0	5.0		5.0		5.0	
Vehicle Extension (s)	3.0		3.0		3.0	3.0		3.0		3.0	
Lane Grp Cap (vph)	1678		1643		425	425		443		475	
v/s Ratio Prot	0.33		0.36		0.08	0.08		0.21		0.07	
v/s Ratio Perm											
Uniform Delay, d1	0.65		0.70		0.53	0.53		0.85		0.27	
Progression Factor	0.35		0.72		1.00	1.00		1.00		1.00	
Incremental Delay, d2	1.6		2.4		1.3	1.3		14.1		0.3	
Delay (s)	7.9		15.7		40.9	40.9		49.6		30.3	
Level of Service	A		B		D	D		D		C	
Approach Delay (s)	7.9		15.7		40.9	40.9		44.5		44.5	
Approach LOS	A		B		D	D		D		D	
Intersection Summary											
HCM Average Control Delay	19.7										
HCM Volume to Capacity ratio	0.71										
Actuated Cycle Length (s)	100.0										
Intersection Capacity Utilization	67.2%										
Analysis Period (min)	15										
Critical Lane Group											

Movement	SBR
Lane Configurations	1900
Ideal Flow (vphpl)	12
Lane Width	12
Total Lost time (s)	
Lane Util. Factor	
Flpb, ped/bikes	
Flpb, ped/bikes	
Flt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Volume (vph)	10
Peak-hour factor, PHF	0.94
Adj. Flow (vph)	11
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Conf. Peds. (#/hr)	17
Heavy Vehicles (%)	3%
Bus Blockages (#/hr)	0
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	
Intersection Summary	

HCM Signalized Intersection Capacity Analysis  
18: Denny Way & Aurora Ave

2025 With Alt 2 - PM Peak Hour  
500 Fifth Avenue North

Movement	EBT	EBR	EBR2	WBT	WBR	NBT	NBR	NBR2	SBL2	SBL	SBT	SBR
Lane Configurations	←↑	←↑	←↑	←↑	←↑	←↑	←↑	←↑	←↑	←↑	←↑	←↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	11	12	12	12	12	12	12	12	12
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Flt Protected	0.99	0.99	0.97	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Flt Permitted	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	3085	3085	3017	3154	3154	3154	3154	3154	3154	3154	3154	3154
Satd. Flow (perm)	3085	3085	3017	3154	3154	3154	3154	3154	3154	3154	3154	3154
Volume (vph)	1247	65	5	1275	315	1125	165	5	245	80	0	490
Peak-hour factor: PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	1272	66	5	1301	321	1148	168	5	250	82	0	500
RTOR Reduction (vph)	0	0	0	22	0	0	0	0	0	0	0	2
Lane Group Flow (vph)	1343	0	0	1600	0	1321	0	0	332	260	258	0
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	4	0
Turn Type	2	2	2	4	4	4	4	4	3	3	8	8
Protected Phases												
Permitted Phases												
Actuated Green, G (s)	26.0	26.0	32.0	32.0	32.1	32.1	32.1	32.1	24.9	60.0	60.0	60.0
Effective Green, g (s)	32.0	32.0	32.0	32.0	32.1	32.1	32.1	32.1	26.9	62.0	62.0	62.0
Actuated g/C Ratio	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.27	0.62	0.62	0.62
Clearance Time (s)	9.0	9.0	9.0	9.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	987	965	1012	965	1012	1012	1012	1012	429	826	839	839
v/s Ratio Prot	0.44	c0.53	c0.42	c0.53	c0.42	c0.42	c0.42	c0.42	c0.21	0.20	0.19	0.19
v/s Ratio Perm												
v/c Ratio	1.36	1.66	1.31	1.66	1.31	1.31	1.31	1.31	0.77	0.31	0.31	0.31
Uniform Delay, d1	34.0	34.0	34.0	34.0	34.0	34.0	34.0	34.0	33.7	9.0	8.9	8.9
Progression Factor	0.99	0.56	1.00	0.56	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	168.6	299.0	144.6	299.0	144.6	144.6	144.6	144.6	8.5	0.2	0.2	0.2
Delay (s)	202.3	317.9	178.6	317.9	178.6	178.6	178.6	178.6	42.2	9.2	9.1	9.1
Level of Service	F	F	F	F	F	F	F	F	D	A	A	A
Approach Delay (s)	202.3	317.9	178.6	317.9	178.6	178.6	178.6	178.6	22.0			
Approach LOS	F	F	F	F	F	F	F	F	C			
Intersection Summary												
HCM Average Control Delay	202.8											
HCM Volume to Capacity ratio	1.27											
Actuated Cycle Length (s)	100.0											
Intersection Capacity Utilization	120.9%											
Analysis Period (min)	15											
Critical Lane Group												

HCM Signalized Intersection Capacity Analysis  
18: Denny Way & Aurora Ave

2025 With Alt 2 - PM Peak Hour  
500 Fifth Avenue North

Movement	EBT	EBR	EBR2	WBT	WBR	NBT	NBR	NBR2	SBL2	SBL	SBT	SBR
Lane Configurations	←↑	←↑	←↑	←↑	←↑	←↑	←↑	←↑	←↑	←↑	←↑	←↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	11	12	12	12	12	12	12	12	12
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Flt Protected	0.99	0.99	0.97	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Flt Permitted	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	3085	3085	3017	3154	3154	3154	3154	3154	3154	3154	3154	3154
Satd. Flow (perm)	3085	3085	3017	3154	3154	3154	3154	3154	3154	3154	3154	3154
Volume (vph)	1247	65	5	1275	315	1125	165	5	245	80	0	490
Peak-hour factor: PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	1272	66	5	1301	321	1148	168	5	250	82	0	500
RTOR Reduction (vph)	0	0	0	22	0	0	0	0	0	0	0	2
Lane Group Flow (vph)	1343	0	0	1600	0	1321	0	0	332	260	258	0
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	4	0
Turn Type	2	2	2	4	4	4	4	4	3	3	8	8
Protected Phases												
Permitted Phases												
Actuated Green, G (s)	26.0	26.0	32.0	32.1	32.1	32.1	32.1	32.1	24.9	60.0	60.0	60.0
Effective Green, g (s)	32.0	32.0	32.0	32.1	32.1	32.1	32.1	32.1	26.9	62.0	62.0	62.0
Actuated g/C Ratio	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.27	0.62	0.62	0.62
Clearance Time (s)	9.0	9.0	9.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	987	965	1012	1012	1012	1012	1012	1012	429	826	839	839
v/s Ratio Prot	0.44	c0.53	c0.42	c0.42	c0.42	c0.42	c0.42	c0.42	c0.21	0.20	0.19	0.19
v/s Ratio Perm												
v/c Ratio	1.36	1.66	1.31	1.31	1.31	1.31	1.31	1.31	0.77	0.31	0.31	0.31
Uniform Delay, d1	34.0	34.0	34.0	34.0	34.0	34.0	34.0	34.0	33.7	9.0	8.9	8.9
Progression Factor	0.99	0.56	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	168.6	299.0	144.6	144.6	144.6	144.6	144.6	144.6	8.5	0.2	0.2	0.2
Delay (s)	202.3	317.9	178.6	178.6	178.6	178.6	178.6	178.6	42.2	9.2	9.1	9.1
Level of Service	F	F	F	F	F	F	F	F	D	A	A	A
Approach Delay (s)	202.3	317.9	178.6	178.6	178.6	178.6	178.6	178.6	22.0			
Approach LOS	F	F	F	F	F	F	F	F	C			
Intersection Summary												
HCM Average Control Delay	202.8											
HCM Volume to Capacity ratio	1.27											
Actuated Cycle Length (s)	100.0											
Intersection Capacity Utilization	120.9%											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis  
 19: Denny Way & Dexter Avenue  
 2025 With Alt 2 - PM Peak Hour  
 500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4T	4T	4T	4T	4T	4T	4T	4T	4T	4T	4T	4T
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Flt	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	3210	3210	3210	3210	3210	3210	3210	3210	3210	3210	3210	3210
Satd. Flow (prot)	3198	3198	3198	3198	3198	3198	3198	3198	3198	3198	3198	3198
Flt Permitted	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52
Satd. Flow (perm)	1678	1678	1678	1678	1678	1678	1678	1678	1678	1678	1678	1678
Volume (vph)	155	1402	10	0	1270	110	10	215	20	115	280	265
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	165	1491	11	0	1351	117	11	229	21	122	298	282
RTOR Reduction (vph)	0	0	0	0	5	0	0	9	0	0	0	219
Lane Group Flow (vph)	0	1687	0	0	1463	0	11	241	0	122	298	63
Heavy Vehicles (%)	1%	1%	1%	0%	0%	0%	11%	11%	11%	2%	2%	2%
Turn Type	pm+pt	pm+pt	pm+pt	pm+pt	pm+pt	pm+pt	pm+pt	pm+pt	pm+pt	pm+pt	pm+pt	pm+pt
Protected Phases	2	5	1	1	1	1	1	1	1	1	1	1
Permitted Phases	5	5	3	3	3	3	3	3	3	3	3	3
Actuated Green, G (s)	68.7	50.7	19.3	19.3	19.3	19.3	19.3	19.3	19.3	19.3	19.3	19.3
Effective Green, g (s)	71.7	53.7	22.3	22.3	22.3	22.3	22.3	22.3	22.3	22.3	22.3	22.3
Actuated g/C Ratio	0.72	0.54	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1431	1724	157	644	192	710	318	0.09	0.09	0.09	0.09	0.09
v/s Ratio Prot	c0.17	0.46	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
v/s Ratio Perm	c0.66	0.85	0.07	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37
Uniform Delay, d1	14.1	19.7	30.7	32.9	35.2	33.3	31.6	0.04	0.04	0.04	0.04	0.04
Progression Factor	0.91	0.85	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	74.9	5.1	0.2	0.4	6.7	0.4	0.3	0.04	0.04	0.04	0.04	0.04
Delay (s)	87.8	17.8	30.9	33.3	41.9	33.7	31.9	0.04	0.04	0.04	0.04	0.04
Level of Service	F	B	C	C	C	C	C	C	C	C	C	C
Approach Delay (s)	87.8	17.8	33.2	33.2	33.2	33.2	33.2	33.2	33.2	33.2	33.2	33.2
Approach LOS	F	B	C	C	C	C	C	C	C	C	C	C
Intersection Summary												
HCM Average Control Delay	50.1											
HCM Volume to Capacity ratio	1.02											
Actuated Cycle Length (s)	100.0											
Intersection Capacity Utilization	119.0%											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis  
 20: Denny Way & Westlake Ave  
 2025 With Alt 2 - PM Peak Hour  
 500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4T	4T	4T	4T	4T	4T	4T	4T	4T	4T	4T	4T
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Flt	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	3087	3087	3087	3087	3087	3087	3087	3087	3087	3087	3087	3087
Satd. Flow (prot)	3087	3087	3087	3087	3087	3087	3087	3087	3087	3087	3087	3087
Flt Permitted	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (perm)	3087	3087	3087	3087	3087	3087	3087	3087	3087	3087	3087	3087
Volume (vph)	0	1582	80	0	1200	280	0	685	230	110	150	60
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	0	1683	85	0	1277	298	0	729	245	117	160	64
RTOR Reduction (vph)	0	4	0	0	20	0	0	9	0	0	27	0
Lane Group Flow (vph)	0	1764	0	0	1555	0	0	965	0	117	197	0
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	0%	0%
Turn Type	pm+pt	pm+pt	pm+pt	pm+pt	pm+pt	pm+pt	pm+pt	pm+pt	pm+pt	pm+pt	pm+pt	pm+pt
Protected Phases	1	1	1	1	1	1	1	1	1	1	1	1
Permitted Phases	1	1	1	1	1	1	1	1	1	1	1	1
Actuated Green, G (s)	52.0	52.0	52.0	52.0	52.0	52.0	52.0	52.0	52.0	52.0	52.0	52.0
Effective Green, g (s)	54.0	54.0	54.0	54.0	54.0	54.0	54.0	54.0	54.0	54.0	54.0	54.0
Actuated g/C Ratio	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1667	1631	1631	1631	1631	1631	1631	1631	1631	1631	1631	1631
v/s Ratio Prot	c0.57	0.51	0.51	0.51	0.51	0.51	0.51	0.51	0.51	0.51	0.51	0.51
v/s Ratio Perm	1.06	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Uniform Delay, d1	23.0	21.8	21.8	21.8	21.8	21.8	21.8	21.8	21.8	21.8	21.8	21.8
Progression Factor	0.70	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	38.8	13.6	13.6	13.6	13.6	13.6	13.6	13.6	13.6	13.6	13.6	13.6
Delay (s)	55.0	35.5	35.5	35.5	35.5	35.5	35.5	35.5	35.5	35.5	35.5	35.5
Level of Service	E	D	D	D	D	D	D	D	D	D	D	D
Approach Delay (s)	55.0	35.5	35.5	35.5	35.5	35.5	35.5	35.5	35.5	35.5	35.5	35.5
Approach LOS	E	D	D	D	D	D	D	D	D	D	D	D
Intersection Summary												
HCM Average Control Delay	45.0											
HCM Volume to Capacity ratio	1.13											
Actuated Cycle Length (s)	100.0											
Intersection Capacity Utilization	97.4%											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis  
21: Denny Way & Fairview Ave

2025 With Alt 2 - PM Peak Hour

500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	11	11	12	11	11	12	9	10	12	10	10	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	12	11	11	12	9	10	12	10	10	12
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00	0.95	1.00	0.95
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1555	3108	1555	3052	1555	3052	2808	2873	1501	2852	1501	2852
Flt Permitted	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	1555	3108	1555	3052	1555	3052	2808	2873	1501	2852	1501	2852
Volume (vph)	235	1229	5	50	820	115	460	545	220	265	340	170
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	245	1280	5	52	854	120	479	568	229	276	354	177
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	245	1285	0	52	963	0	479	751	0	276	466	0
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	1	6	5	2	3	8	3	8	7	4	4	4
Permitted Phases												
Actuated Green, G (s)	13.5	34.7	6.8	28.0	18.5	29.5	9.0	20.0	9.0	20.0	9.0	20.0
Effective Green, g (s)	15.5	36.7	8.8	30.0	20.5	31.5	11.0	22.0	11.0	22.0	11.0	22.0
Actuated g/C Ratio	0.16	0.37	0.09	0.30	0.20	0.32	0.11	0.22	0.11	0.22	0.11	0.22
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	241	1141	137	916	576	905	165	627	165	627	165	627
v/s Ratio Prot	c0.16	c0.41	0.03	0.32	c0.17	c0.26	c0.18	0.16	c0.18	0.16	c0.18	0.16
v/s Ratio Perm												
v/c Ratio	1.02	1.13	0.38	1.05	0.83	0.83	1.67	0.74	1.67	0.74	1.67	0.74
Uniform Delay, d1	42.2	31.6	43.0	35.0	38.1	31.8	44.5	36.4	44.5	36.4	44.5	36.4
Progression Factor	1.00	1.00	0.89	1.22	1.00	1.00	1.07	0.86	1.07	0.86	1.07	0.86
Incremental Delay, d2	62.3	68.5	1.4	41.0	9.9	6.4	326.8	4.6	326.8	4.6	326.8	4.6
Delay (s)	104.6	100.1	39.6	83.7	48.0	38.1	374.7	35.8	374.7	35.8	374.7	35.8
Level of Service	F	F	D	F	D	D	F	D	F	D	F	D
Approach Delay (s)	100.8		81.4			41.9		151.7				151.7
Approach LOS	F		F			D		F				F
Intersection Summary												
HCM Average Control Delay	89.2											
HCM Volume to Capacity ratio	1.05											
Actuated Cycle Length (s)	100.0											
Intersection Capacity Utilization	97.9%											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis  
22: Denny Way & Stewart St

2025 With Alt 2 - PM Peak Hour

500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	11	11	12	11	11	12	9	10	12	10	10	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	12	11	11	12	9	10	12	10	10	12
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	1.00	0.95	1.00	1.00	1.00	0.97	0.95	1.00	0.95	1.00	0.95
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	2969	1000	2969	1593	1676	1593	1676	1593	1676	1593	1676	1593
Flt Permitted	1.00	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Satd. Flow (perm)	2969	1000	2969	1593	1676	1593	1676	1593	1676	1593	1676	1593
Volume (vph)	0	850	894	345	915	0	0	0	0	0	0	0
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	0	867	912	352	934	0	0	0	0	0	0	0
RTOR Reduction (vph)	0	40	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	1739	0	352	934	0	0	0	0	0	0	0
Heavy Vehicles (%)	1%	1%	1%	2%	2%	2%	0%	0%	0%	0%	11%	11%
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	3	2	2	2	3	1	1	1	1	1	1	1
Permitted Phases												
Actuated Green, G (s)	43.5	21.5	21.5	69.5	21.5	21.5	21.5	21.5	21.5	21.5	21.5	21.5
Effective Green, g (s)	45.0	23.0	23.0	71.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0
Actuated g/C Ratio	0.45	0.23	0.23	0.71	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1336	366	366	1190	366	366	1190	366	366	366	366	366
v/s Ratio Prot	c0.59	c0.22	c0.22	0.56	c0.22	c0.22	c0.22	c0.22	c0.22	c0.22	c0.22	c0.22
v/s Ratio Perm												
v/c Ratio	1.30	0.96	0.96	0.78	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Uniform Delay, d1	27.5	38.1	38.1	9.5	38.1	38.1	38.1	38.1	38.1	38.1	38.1	38.1
Progression Factor	0.87	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	140.9	38.3	38.3	3.5	38.3	38.3	38.3	38.3	38.3	38.3	38.3	38.3
Delay (s)	164.9	76.4	76.4	13.0	76.4	76.4	76.4	76.4	76.4	76.4	76.4	76.4
Level of Service	F	E	E	B	E	E	E	E	E	E	E	E
Approach Delay (s)	164.9		30.3			0.0		102.2				102.2
Approach LOS	F	F	C			A		F				F
Intersection Summary												
HCM Average Control Delay	106.5											
HCM Volume to Capacity ratio	1.17											
Actuated Cycle Length (s)	100.0											
Intersection Capacity Utilization	110.8%											
Analysis Period (min)	15											
c Critical Lane Group												



HCM Signalized Intersection Capacity Analysis  
 23: Yale St & Stewart St

HCM Signalized Intersection Capacity Analysis  
 24: Yale St & Howell St

2025 With Alt 2 - PM Peak Hour  
 500 Fifth Avenue North

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fit Protected	1.00	0.85	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	1663	1439	1593	1676								
Fit Permitted	1.00	1.00	0.09	1.00								
Satd. Flow (perm)	1693	1439	149	1676								
Volume (vph)	0	774	115	65	5	0	0	0	0	0	430	1010
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	0	823	122	69	5	0	0	0	0	0	457	1074
RTOR Reduction (vph)	0	0	32	0	0	0	0	0	0	0	0	1
Lane Group Flow (vph)	0	823	90	69	5	0	0	0	0	0	457	1078
Heavy Vehicles (%)	1%	1%	1%	2%	2%	2%	0%	0%	0%	0%	10%	10%
Turn Type	3	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	3	3	3	3	3	3	3	3	3	3	3	3
Permitted Phases	43.5	43.5	43.5	43.5	43.5	43.5	43.5	43.5	43.5	43.5	43.5	43.5
Actuated Green, G (s)	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0
Effective Green, g (s)	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45
Actuated g/C Ratio	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Clearance Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Vehicle Extension (s)	762	648	67	754							724	2078
Lane Grp Cap (vph)	c0.49	0.06	0.46								c0.31	0.25
v/s Ratio Prot	1.08	0.14	1.03	0.01							0.63	0.52
v/s Ratio Perm	27.5	16.1	27.5	15.2							18.8	17.4
Uniform Delay, d1	0.77	0.33	1.06	1.19							0.76	0.70
Progression Factor	50.9	0.1	88.2	0.0							0.4	0.1
Incremental Delay, d2	72.1	5.4	117.3	18.0							14.6	12.4
Delay (s)	E	A	F	B							B	B
Level of Service	63.5	E	A	F							B	B
Approach Delay (s)	E										13.0	
Approach LOS	E										A	B
Intersection Summary												
HCM Average Control Delay			34.5								HCM Level of Service	C
HCM Volume to Capacity ratio			0.85									
Actuated Cycle Length (s)			100.0								Sum of lost time (s)	6.0
Intersection Capacity Utilization			85.7%								ICU Level of Service	E
Analysis Period (min)			15									
c Critical Lane Group												

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fit Protected	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	1593	1339								3115	1398	1671
Fit Permitted	1.00	1.00								0.92	1.00	1.00
Satd. Flow (perm)	1593	1339								2866	1398	1671
Volume (vph)	55	1134	10	0	0	0	0	0	0	60	920	860
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	57	1181	10	0	0	0	0	0	0	62	958	896
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	43	0
Lane Group Flow (vph)	57	1191	0	0	0	0	0	0	0	1020	853	0
Heavy Vehicles (%)	2%	2%	2%	0%	0%	0%	0%	0%	0%	4%	4%	2%
Parking (#/hr)	20											
Turn Type	Split	Split	Split	Split	Split	Split	Split	Split	Split	Split	Split	Split
Protected Phases	2	2								1	1	1
Permitted Phases												
Actuated Green, G (s)	55.0	55.0								35.0	35.0	35.0
Effective Green, g (s)	57.0	57.0								37.0	37.0	37.0
Actuated g/C Ratio	0.57	0.57								0.37	0.37	0.37
Clearance Time (s)	5.0	5.0								5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0								3.0	3.0	3.0
Lane Grp Cap (vph)	908	763								1060	517	618
v/s Ratio Prot	0.04	c0.89								0.36	c0.61	0.13
v/s Ratio Perm												
v/c Ratio	0.06	1.56								0.96	1.65	0.34
Uniform Delay, d1	9.6	21.5								30.8	31.5	22.7
Progression Factor	1.47	1.57								1.00	1.00	1.00
Incremental Delay, d2	0.0	254.6								19.9	300.6	1.5
Delay (s)	14.1	288.4								50.7	332.1	24.3
Level of Service	B	F								D	F	C
Approach Delay (s)										182.3		24.3
Approach LOS										F		C
Intersection Summary												
HCM Average Control Delay			206.9							HCM Level of Service		F
HCM Volume to Capacity ratio			1.59									
Actuated Cycle Length (s)			100.0							Sum of lost time (s)		6.0
Intersection Capacity Utilization			132.8%							ICU Level of Service		H
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis  
 25: Harrison St & Site Access

2025 With Alt 2 - PM Peak Hour  
 500 Fifth Avenue North

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↑	↑	↑↑	↑↑	↑	↑
Sign Control	Free	Free	Stop	Stop	0%	0%
Grade	0%	0%	0%	0%	0%	0%
Volume (veh/h)	0	20	825	40	0	44
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	22	897	43	0	48
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type						None
Median storage (veh)						
Upstream signal (ft)		173				
pX, platoon unblocked						
vC, conflicting volume	940				940	321
vC1, stage 1 conf vol						
vC2, stage 2 conf vol	940				940	321
vCu, unblocked vol	4.1				6.8	6.9
tC, single (s)						
tC, 2 stage (s)	2.2				3.5	3.3
tF (s)						
p0 queue free %	100				100	93
cM capacity (veh/h)	725				262	675
Direction, Lane #	EB1	WB1	WB2	WB3	SB1	
Volume Total	22	359	359	223	48	
Volume Left	0	0	0	0	0	
Volume Right	0	0	0	43	48	
cSH	1700	1700	1700	1700	675	
Volume to Capacity	0.01	0.21	0.21	0.13	0.07	
Queue Length 95th (ft)	0	0	0	0	6	
Control Delay (s)	0.0	0.0	0.0	0.0	10.7	
Lane LOS					B	
Approach Delay (s)	0.0	0.0			10.7	
Approach LOS					B	
Intersection Summary						
Average Delay			0.5			
Intersection Capacity Utilization			26.8%			A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis  
 26: Mercer St & Site Driveway

2025 With Alt 2 - PM Peak Hour  
 500 Fifth Avenue North

Movement	EBT	EBR	WBT	WBR	NBT	NBR
Lane Configurations	↑↑↑	↑↑↑	Free	Free	Stop	↑
Sign Control	0%	0%	0%	0%	0%	0%
Grade	0%	0%	0%	0%	0%	0%
Volume (veh/h)	1926	7	0	0	0	342
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	2140	8	0	0	0	380
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type						None
Median storage (veh)						
Upstream signal (ft)	646			646		
pX, platoon unblocked				0.97		0.97
vC, conflicting volume	2148			2144		539
vC1, stage 1 conf vol						
vC2, stage 2 conf vol	2084			4.1		2080
vCu, unblocked vol				6.8		6.9
tC, single (s)						
tC, 2 stage (s)	2.2			3.5		3.3
tF (s)						
p0 queue free %	100			100		32
cM capacity (veh/h)	253			44		563
Direction, Lane #	EB1	EB2	EB3	EB4	NB1	
Volume Total	611	611	611	313	380	
Volume Left	0	0	0	0	0	
Volume Right	0	0	0	8	380	
cSH	1700	1700	1700	1700	563	
Volume to Capacity	0.36	0.36	0.36	0.18	0.68	
Queue Length 95th (ft)	0	0	0	0	128	
Control Delay (s)	0.0	0.0	0.0	0.0	23.7	
Lane LOS					C	
Approach Delay (s)	0.0				23.7	
Approach LOS					C	
Intersection Summary						
Average Delay			3.6			
Intersection Capacity Utilization			55.9%			B
Analysis Period (min)			15			



## 2025 Alternative 3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	12	12	12	11	11	11	12	11	12	11	11	12
Lane Width	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Total Lost time (s)	1.00	1.00	1.00	0.95	0.95	0.95	1.00	0.98	1.00	0.98	1.00	1.00
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	0.95	1.00	0.98	1.00	0.98	1.00	1.00
Frbp, ped/bikes	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	0.95	0.95	0.95	1.00	0.97	1.00	0.97	1.00	0.95
Flt Protected	0.97	0.97	0.95	0.95	0.95	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Satd. Flow (prot)	1398	1398	1398	1398	1398	1398	1398	1398	1398	1398	1398	1398
Flt Permitted	0.97	0.97	0.95	0.95	0.95	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Satd. Flow (perm)	1398	1398	1398	1398	1398	1398	1398	1398	1398	1398	1398	1398
Volume (vph)	0	0	0	84	45	5	404	155	63	15	245	65
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	88	47	5	425	163	66	16	258	68
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	139	0	353	294	0	16	320	0
Confl. Peds. (#/hr)	0	0	0	7	20	14	12	12	12	12	28	28
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	6%	6%	6%	5%	5%	5%
Parking (#/hr)	0	0	0	0	0	0	15	8	8	8	8	8
Turn Type	Protected Phases	Permitted Phases	Protected Phases	Permitted Phases	Protected Phases	Permitted Phases	Protected Phases	Permitted Phases	Protected Phases	Permitted Phases	Protected Phases	Permitted Phases
Protected Phases	1	2	1	2	1	2	1	2	1	2	1	2
Permitted Phases	1	2	1	2	1	2	1	2	1	2	1	2
Actuated Green, G (s)	16.5	75.0	80.5	16.5	75.0	80.5	16.5	75.0	80.5	16.5	75.0	80.5
Effective Green, g (s)	19.0	80.0	83.0	19.0	80.0	83.0	19.0	80.0	83.0	19.0	80.0	83.0
Actuated g/C Ratio	0.16	0.67	0.69	0.16	0.67	0.69	0.16	0.67	0.69	0.16	0.67	0.69
Clearance Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	455	804	2036	455	804	2036	455	804	2036	455	804	2036
v/s Ratio Prot	0.15	0.20	c0.83	0.15	0.20	c0.83	0.15	0.20	c0.83	0.15	0.20	c0.83
v/s Ratio Perm	0.92	0.40	1.21	0.92	0.40	1.21	0.92	0.40	1.21	0.92	0.40	1.21
Uniform Delay, d1	49.8	15.2	18.5	49.8	15.2	18.5	49.8	15.2	18.5	49.8	15.2	18.5
Progression Factor	1.00	0.24	0.20	1.00	0.24	0.20	1.00	0.24	0.20	1.00	0.24	0.20
Incremental Delay, d2	26.8	0.0	93.1	26.8	0.0	93.1	26.8	0.0	93.1	26.8	0.0	93.1
Delay (s)	76.6	3.7	96.7	76.6	3.7	96.7	76.6	3.7	96.7	76.6	3.7	96.7
Level of Service	E	A	F	E	A	F	E	A	F	E	A	F
Approach Delay (s)	76.6	3.7	96.7	76.6	3.7	96.7	76.6	3.7	96.7	76.6	3.7	96.7
Approach LOS	E	A	F	E	A	F	E	A	F	E	A	F
Intersection Summary												
HCM Average Control Delay	77.9											
HCM Volume to Capacity ratio	1.14											
Actuated Cycle Length (s)	120.0											
Intersection Capacity Utilization	97.0%											
Analysis Period (min)	15											
c Critical Lane Group												

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	12	12	12	11	11	11	12	11	12	11	11	12
Lane Width	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Total Lost time (s)	1.00	1.00	1.00	0.95	0.95	0.95	1.00	0.98	1.00	0.98	1.00	1.00
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	0.95	1.00	0.98	1.00	0.98	1.00	1.00
Frbp, ped/bikes	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	0.95	0.95	0.95	1.00	0.97	1.00	0.97	1.00	0.95
Flt Protected	0.97	0.97	0.95	0.95	0.95	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Satd. Flow (prot)	1398	1398	1398	1398	1398	1398	1398	1398	1398	1398	1398	1398
Flt Permitted	0.97	0.97	0.95	0.95	0.95	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Satd. Flow (perm)	1398	1398	1398	1398	1398	1398	1398	1398	1398	1398	1398	1398
Volume (vph)	0	0	0	84	45	5	404	155	63	15	245	65
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	88	47	5	425	163	66	16	258	68
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	139	0	353	294	0	16	320	0
Confl. Peds. (#/hr)	0	0	0	7	20	14	12	12	12	12	28	28
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	6%	6%	6%	5%	5%	5%
Parking (#/hr)	0	0	0	0	0	0	15	8	8	8	8	8
Turn Type	Protected Phases	Permitted Phases	Protected Phases	Permitted Phases	Protected Phases	Permitted Phases	Protected Phases	Permitted Phases	Protected Phases	Permitted Phases	Protected Phases	Permitted Phases
Protected Phases	1	2	1	2	1	2	1	2	1	2	1	2
Permitted Phases	1	2	1	2	1	2	1	2	1	2	1	2
Actuated Green, G (s)	16.5	75.0	80.5	16.5	75.0	80.5	16.5	75.0	80.5	16.5	75.0	80.5
Effective Green, g (s)	19.0	80.0	83.0	19.0	80.0	83.0	19.0	80.0	83.0	19.0	80.0	83.0
Actuated g/C Ratio	0.16	0.67	0.69	0.16	0.67	0.69	0.16	0.67	0.69	0.16	0.67	0.69
Clearance Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	455	804	2036	455	804	2036	455	804	2036	455	804	2036
v/s Ratio Prot	0.15	0.20	c0.83	0.15	0.20	c0.83	0.15	0.20	c0.83	0.15	0.20	c0.83
v/s Ratio Perm	0.92	0.40	1.21	0.92	0.40	1.21	0.92	0.40	1.21	0.92	0.40	1.21
Uniform Delay, d1	49.8	15.2	18.5	49.8	15.2	18.5	49.8	15.2	18.5	49.8	15.2	18.5
Progression Factor	1.00	0.24	0.20	1.00	0.24	0.20	1.00	0.24	0.20	1.00	0.24	0.20
Incremental Delay, d2	26.8	0.0	93.1	26.8	0.0	93.1	26.8	0.0	93.1	26.8	0.0	93.1
Delay (s)	76.6	3.7	96.7	76.6	3.7	96.7	76.6	3.7	96.7	76.6	3.7	96.7
Level of Service	E	A	F	E	A	F	E	A	F	E	A	F
Approach Delay (s)	76.6	3.7	96.7	76.6	3.7	96.7	76.6	3.7	96.7	76.6	3.7	96.7
Approach LOS	E	A	F	E	A	F	E	A	F	E	A	F
Intersection Summary												
HCM Average Control Delay	77.9											
HCM Volume to Capacity ratio	1.14											
Actuated Cycle Length (s)	120.0											
Intersection Capacity Utilization	97.0%											
Analysis Period (min)	15											
c Critical Lane Group												

# HCM Signalized Intersection Capacity Analysis 3: Broad St & Westlake Ave

## 2025 With Alt 3 - AM Peak Hour 500 Fifth Avenue North

## 2025 With Alt 3 - AM Peak Hour 500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4T	4T	4T	4T	4T	4T	4T	4T	4T	4T	4T	4T
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	12	12	10	12	12	10	12	12	12	12
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00
Fltb, ped/bikes	0.98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fltb, ped/bikes	1.00	1.00	1.00	1.00	0.96	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.97	1.00	1.00	0.85	1.00	0.91	1.00	1.00	1.00	1.00	1.00	1.00
Flt Permitted	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	2953	1608	3002	1439	1529	2706	1624	1710				
Flt Permitted	0.71	0.47	1.00	1.00	0.30	1.00	0.17	1.00				
Satd. Flow (perm)	2111	791	3002	1439	486	2706	297	1710				
Volume (vph)	15	355	80	355	2448	835	65	243	363	75	280	0
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	16	370	83	370	2550	870	68	253	378	78	292	0
RTOR Reduction (vph)	0	15	0	0	0	88	0	227	0	0	0	0
Lane Group Flow (vph)	0	454	0	370	2550	782	68	405	0	78	292	0
Conf. Peds. (#/hr)			50			50						
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	2%	2%	0%	0%	0%
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	2			2				1			1	
Permitted Phases	2			2				1			1	
Actuated Green, G (s)	81.5	81.5	81.5	81.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5
Effective Green, g (s)	84.0	84.0	84.0	84.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0
Actuated g/C Ratio	0.70	0.70	0.70	0.70	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Clearance Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1478	554	2101	1007	122	677	74	428				
v/s Ratio Prot												
v/s Ratio Perm	0.21	0.47	0.54	0.14					0.26		0.17	
v/c Ratio	0.31	0.67	1.21	0.78	0.56	0.60			1.05		0.68	
Uniform Delay, d1	6.9	10.1	18.0	11.8	39.2	39.7			45.0		40.7	
Progression Factor	0.66	0.63	0.62	0.48	1.40	2.05			1.00		1.00	
Incremental Delay, d2	0.0	1.9	99.1	2.4	8.2	1.8			120.3		8.5	
Delay (s)	4.6	8.3	110.3	8.1	63.2	83.2			165.3		49.2	
Level of Service	A	A	F	A	E	F			F		D	
Approach Delay (s)	4.6		76.9		81.3				73.7		E	
Approach LOS	A		E		F				F		E	
Intersection Summary												
HCM Average Control Delay									62.1		HCM Level of Service	E
HCM Volume to Capacity ratio									1.02			
Actuated Cycle Length (s)									120.0		Sum of lost time (s)	6.0
Intersection Capacity Utilization									89.1%		ICU Level of Service	E
Analysis Period (min)									15			
c Critical Lane Group												

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Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↕↕	↕	↕	↕↕	↕↕↕	↕
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	10	12	12	12	12	12
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	1.00	1.00	0.95	0.94	1.00
Flt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	2944	1411	812	3124	4491	1425
Flt Permitted	1.00	1.00	0.13	1.00	0.95	1.00
Satd. Flow (perm)	2944	1411	114	3124	4491	1425
Volume (vph)	688	20	5	829	2694	685
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	732	21	5	882	2866	729
RTOR Reduction (vph)	0	5	0	0	0	6
Lane Group Flow (vph)	732	16	5	882	2866	723
Heavy Vehicles (%)	3%	3%	100%	4%	2%	2%
Turn Type		Perm	D	P+P		p+ov
Protected Phases	4		3	3	4	2
Permitted Phases		4				2
Actuated Green, G (s)	28.0	28.0	37.0	42.0	88.0	82.0
Effective Green, g (s)	30.0	30.0	41.0	44.0	70.0	84.0
Actuated g/C Ratio	0.25	0.25	0.34	0.37	0.58	0.70
Clearance Time (s)	5.0	5.0	5.0		5.0	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	736	353	103	1145	2620	988
v/s Ratio Prot	c0.25		0.00	0.28	c0.64	c0.51
v/s Ratio Perm		0.01				
v/c Ratio	0.99	0.04	0.05	0.77	1.09	0.72
Uniform Delay, d1	44.9	34.1	28.1	33.5	25.0	11.0
Progression Factor	1.37	1.55	1.00	1.00	1.26	1.33
Incremental Delay, d2	30.5	0.2	0.2	3.3	43.0	0.2
Delay (s)	91.9	53.0	28.3	36.8	74.5	14.8
Level of Service	F	D	C	D	E	B
Approach Delay (s)	90.8			36.8	62.4	
Approach LOS	F			D	E	
Intersection Summary						
HCM Average Control Delay			62.1			HCM Level of Service
HCM Volume to Capacity ratio			1.02			E
Actuated Cycle Length (s)			120.0			Sum of lost time (s)
Intersection Capacity Utilization			89.1%			6.0
Analysis Period (min)			15			ICU Level of Service
						E
Critical Lane Group						

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HCM Signalized Intersection Capacity Analysis  
5: Mercer St & 1st Avenue

HCM Signalized Intersection Capacity Analysis  
6: Mercer St & 5th Ave

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4↑	4↑	4↑	4↑	4↑	4↑	4↑	4↑	4↑	4↑	4↑	4↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Flt Protected	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	3298	3298	3298	3298	3298	3298	3298	3298	3298	3298	3298	3298
Flt Permitted	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (perm)	3298	3298	3298	3298	3298	3298	3298	3298	3298	3298	3298	3298
Volume (vph)	45	1289	0	0	0	0	0	75	205	125	0	0
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	47	1343	0	0	0	0	0	78	214	130	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	34	0	0	0
Lane Group Flow (vph)	0	1390	0	0	0	0	0	78	310	0	0	0
Heavy Vehicles (%)	3%	3%	3%	0%	0%	0%	0%	10%	10%	10%	0%	0%
Parking (#/hr)	3	3	3	3	3	3	3	3	3	3	3	3
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	1	1	1	1	1	1	1	1	1	1	1	1
Permitted Phases	1	1	1	1	1	1	1	1	1	1	1	1
Actuated Green, G (s)	46.0	46.0	46.0	46.0	46.0	46.0	46.0	46.0	46.0	46.0	46.0	46.0
Effective Green, g (s)	47.0	47.0	47.0	47.0	47.0	47.0	47.0	47.0	47.0	47.0	47.0	47.0
Actuated g/C Ratio	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Grp Cap (vph)	1938	1938	1938	1938	1938	1938	1938	1938	1938	1938	1938	1938
v/s Ratio Prot	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42
v/s Ratio Perm	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72
Uniform Delay, d1	11.8	11.8	11.8	11.8	11.8	11.8	11.8	11.8	11.8	11.8	11.8	11.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3
Delay (s)	14.1	14.1	14.1	14.1	14.1	14.1	14.1	14.1	14.1	14.1	14.1	14.1
Level of Service	B	B	B	B	B	B	B	B	B	B	B	B
Approach Delay (s)	14.1	14.1	14.1	14.1	14.1	14.1	14.1	14.1	14.1	14.1	14.1	14.1
Approach LOS	B	B	B	B	B	B	B	B	B	B	B	B
Intersection Summary												
HCM Average Control Delay	15.5											
HCM Volume to Capacity ratio	0.57											
Actuated Cycle Length (s)	80.0											
Intersection Capacity Utilization	58.6%											
Analysis Period (min)	15											
c Critical Lane Group												

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4↑↑↑	4↑↑↑	4↑↑↑	4↑↑↑	4↑↑↑	4↑↑↑	4↑↑↑	4↑↑↑	4↑↑↑	4↑↑↑	4↑↑↑	4↑↑↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	11	12	12	12	12	12	12	11	11	12
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Flt Protected	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	3069	3069	3069	3069	3069	3069	3069	3069	3069	3069	3069	3069
Flt Permitted	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (perm)	3069	3069	3069	3069	3069	3069	3069	3069	3069	3069	3069	3069
Volume (vph)	15	1266	183	0	0	0	0	0	0	602	299	113
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	16	1333	203	0	0	0	0	0	0	634	315	119
RTOR Reduction (vph)	0	0	40	0	0	0	0	0	0	186	0	0
Lane Group Flow (vph)	0	1349	163	0	0	0	0	0	0	634	129	82
Heavy Vehicles (%)	4%	4%	4%	0%	0%	0%	0%	0%	0%	5%	5%	5%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)	25	25	25	25	25	25	25	25	25	25	25	25
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	2	2	2	2	2	2	2	2	2	2	2	2
Permitted Phases	2	2	2	2	2	2	2	2	2	2	2	2
Actuated Green, G (s)	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0
Effective Green, g (s)	46.0	46.0	46.0	46.0	46.0	46.0	46.0	46.0	46.0	46.0	46.0	46.0
Actuated g/C Ratio	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lane Grp Cap (vph)	1880	1880	1880	1880	1880	1880	1880	1880	1880	1880	1880	1880
v/s Ratio Prot	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24
v/s Ratio Perm	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72
v/c Ratio	41.3	41.3	41.3	41.3	41.3	41.3	41.3	41.3	41.3	41.3	41.3	41.3
Uniform Delay, d1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4
Delay (s)	43.7	43.7	43.7	43.7	43.7	43.7	43.7	43.7	43.7	43.7	43.7	43.7
Level of Service	D	D	D	D	D	D	D	D	D	D	D	D
Approach Delay (s)	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0
Approach LOS	D	D	D	D	D	D	D	D	D	D	D	D
Intersection Summary												
HCM Average Control Delay	38.8											
HCM Volume to Capacity ratio	0.51											
Actuated Cycle Length (s)	140.0											
Intersection Capacity Utilization	62.9%											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis  
7: Mercer St & Dexter Avenue

2025 With Alt 3 - AM Peak Hour

500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBR	NBT	NBR	SBT	NEL	NER	NER2
Lane Configurations	411A									
Ideal Flow (vphpt)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	10	11	10	12	12	12
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.86	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	0.95
Flt. Protected	0.99	0.86	1.00	0.85	1.00	0.85	1.00	0.87	0.85	0.85
Flt. Protected	1.00	1.00	1.00	1.00	0.95	1.00	0.95	1.00	0.99	1.00
Satd. Flow (prot)	5684	1382	2861	1326	1501	3217	1441	1341	1341	1341
Flt Permitted	1.00	1.00	1.00	1.00	0.49	1.00	0.99	1.00	1.00	1.00
Satd. Flow (perm)	5684	1382	2861	1326	769	3217	1441	1341	1341	1341
Volume (vph)	136	1796	155	35	195	70	250	595	30	300
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	155	2041	176	40	222	80	284	676	34	341
RTOR Reduction (vph)	0	0	0	22	0	29	0	0	0	1
Lane Group Flow (vph)	0	2372	0	18	222	51	284	676	205	175
Heavy Vehicles (%)	2%	2%	2%	7%	6%	6%	1%	3%	3%	3%
Turn Type	Perm	Perm	Perm	custom	1	4	3	7	2	2
Protected Phases	1	1	1	4	3	7	2	2	2	2
Permitted Phases	1	1	1	4	7	7	7	7	7	7
Actuated Green, G (s)	60.0	60.0	30.0	30.0	48.0	48.0	14.0	14.0	14.0	14.0
Effective Green, g (s)	63.0	63.0	33.0	33.0	51.0	51.0	17.0	17.0	17.0	17.0
Actuated g/C Ratio	0.45	0.45	0.24	0.24	0.36	0.36	0.12	0.12	0.12	0.12
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lane Grp Cap (vph)	2558	622	674	313	359	1172	175	163	163	163
v/s Ratio Prot	0.01	0.08	0.08	0.08	0.21	0.21	0.14	0.13	0.13	0.13
v/s Ratio Perm	0.42	0.93	0.03	0.33	0.16	0.79	0.58	1.17	1.07	1.07
Uniform Delay, d1	36.3	21.5	44.3	42.5	37.4	35.8	61.5	61.5	61.5	61.5
Progression Factor	0.86	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	7.1	0.1	1.3	1.1	16.2	2.1	121.7	91.7	91.7	91.7
Delay (s)	38.5	21.5	45.6	43.6	53.6	37.9	183.2	153.2	153.2	153.2
Level of Service	D	C	D	D	D	D	F	F	F	F
Approach Delay (s)	38.5			45.1			42.5	169.3		
Approach LOS	D			D			D	F		
Intersection Summary										
HCM Average Control Delay	52.1			HCM Level of Service			D			
HCM Volume to Capacity ratio	0.90			Sum of lost time (s)			9.0			
Actuated Cycle Length (s)	140.0			ICU Level of Service			E			
Intersection Capacity Utilization	82.8%			Analysis Period (min)			15			
Analysis Period (min)	15			Critical Lane Group			c			

2025 With Alt 3 - AM Peak Hour

500 Fifth Avenue North

Movement	EBT	EBR	SBL	SBT	SBR	SER
Lane Configurations	THB			TH		TH
Ideal Flow (vphpl)	1900	1900	1200	1900	1900	1900
Lane Width	11	12	12	9	12	11
Total Lost time (s)	3.0	3.0	3.0	3.0		
Lane Util. Factor	0.86		0.91	0.91		
Flpb, ped/bikes	1.00		1.00	1.00		
Flpb, ped/bikes	1.00		0.88	0.99		
Flt	0.99		1.00	0.99		
Flt Protected	1.00		0.95	1.00		
Satd. Flow (prot)	5536		1251	2647		
Flt Permitted	1.00		0.95	1.00		
Satd. Flow (perm)	5536		1251	2647		
Volume (vph)	2141	105	465	825	35	0
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	2302	113	500	887	38	0
RTOR Reduction (vph)	6	0	4	3	0	0
Lane Group Flow (vph)	2409	0	453	965	0	0
Confli: Peds. (#/hr)			50			
Heavy Vehicles (%)	2%	2%	4%	4%	4%	0%
Bus Blockages (#/hr)	0	0	0	2	0	0
Turn Type			Perm		custom	
Protected Phases	1			2!		2!
Permitted Phases						
Actuated Green, G(s)	70.5		38.5	38.5		
Effective Green, g(s)	73.0		41.0	41.0		
Actuated g/C Ratio	0.61		0.34	0.34		
Clearance Time (s)	5.5		5.5	5.5		
Vehicle Extension (s)	3.0		3.0	3.0		
Lane Grp Cap (vph)	3368		427	904		
v/s Ratio Prot	0.44					
v/s Ratio Perm			0.36	0.36		
v/c Ratio	0.72		1.06	1.07		
Uniform Delay, d1	16.3		39.5	39.5		
Progression Factor	1.00		0.69	0.70		
Incremental Delay, d2	1.3		53.5	45.2		
Delay (s)	17.6		80.9	72.9		
Level of Service	B		F	E		
Approach Delay (s)	17.6			75.4		
Approach LOS	B			E		
Intersection Summary						
HCM Average Control Delay	39.1			HCM Level of Service		
HCM Volume to Capacity ratio	0.84			D		
Actuated Cycle Length (s)	120.0			Sum of lost time (s)		
Intersection Capacity Utilization	70.8%			6.0		
Analysis Period (min)	15			ICU Level of Service		
! Phase conflict between lane groups.						
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis  
 9: Mercer St & Westlake Ave

2025 With Alt 3 - AM Peak Hour  
 500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4111											
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	12	12	12	12	12	11	12	12	12	12
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.86	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Frt	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Satd. Flow (prot)	5532	5532	5532	5532	5532	5532	5532	5532	5532	5532	5532	5532
Flt Permitted	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Satd. Flow (perm)	5532	5532	5532	5532	5532	5532	5532	5532	5532	5532	5532	5532
Volume (vph)	316	2640	50	0	0	0	0	380	120	205	330	0
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	329	2750	52	0	0	0	0	396	125	214	344	0
RTOR Reduction (vph)	0	2	0	0	0	0	0	0	35	0	0	0
Lane Group Flow (vph)	0	3129	0	0	0	0	0	396	90	214	344	0
Heavy Vehicles (%)	2%	2%	2%	0%	0%	0%	4%	4%	4%	0%	0%	0%
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Prot	Prot	Prot
Protected Phases	4	4	4	4	4	4	4	6	6	5	2	2
Permitted Phases	4	4	4	4	4	4	4	6	6	5	2	2
Actuated Green, G (s)	68.8	17.4	17.4	17.4	17.4	17.4	17.4	17.4	17.4	16.3	40.2	40.2
Effective Green, g (s)	71.3	20.4	20.4	20.4	20.4	20.4	20.4	20.4	20.4	19.3	42.7	42.7
Actuated g/C Ratio	0.59	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.16	0.36	0.36
Clearance Time (s)	5.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	5.5	5.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	3287	492	216	261	608	492	216	261	608	492	216	261
v/s Ratio Prot	0.57	c0.14	c0.14	c0.13	c0.13	c0.13	c0.13	c0.13	c0.13	0.20	0.20	0.20
v/s Ratio Perm	0.95	0.80	0.42	0.82	0.82	0.82	0.82	0.82	0.82	0.57	0.57	0.57
Uniform Delay, d1	22.8	47.9	44.5	48.7	31.2	47.9	44.5	48.7	31.2	47.9	44.5	48.7
Progression Factor	0.68	0.92	0.87	0.90	0.87	0.92	0.87	0.90	0.87	0.90	0.87	0.87
Incremental Delay, d2	6.0	9.2	1.3	14.3	0.9	9.2	1.3	14.3	0.9	9.2	1.3	14.3
Delay (s)	21.4	53.3	40.0	57.9	27.9	21.4	53.3	40.0	57.9	27.9	27.9	27.9
Level of Service	C	D	D	D	E	C	D	D	E	C	C	C
Approach Delay (s)	21.4	50.1	47.1	47.1	39.4	21.4	50.1	47.1	47.1	39.4	39.4	39.4
Approach LOS	C	D	D	D	C	C	D	D	D	C	D	D
Intersection Summary												
HCM Average Control Delay	27.3 HCM Level of Service											
HCM Volume to Capacity ratio	0.90 C											
Actuated Cycle Length (s)	120.0 Sum of lost time (s)											
Intersection Capacity Utilization	84.5% ICU Level of Service											
Analysis Period (min)	15 E											
Critical Lane Group												

HCM Signalized Intersection Capacity Analysis  
 10: Mercer St & Fairview Ave

2025 With Alt 3 - AM Peak Hour  
 500 Fifth Avenue North

Movement	EBL	EBT	EBR	EBR2	WBL	WBR	NBT	NBR	NBR2	SBT
Lane Configurations	4T+T	4T+T	T	T	T	T	T	T	T	T
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	12	12	12	12	10	12	12	12
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.91	1.00	0.97	0.88	1.00	0.88	1.00	0.88	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.85	1.00	0.85	1.00	0.85	1.00
Flt Protected	1.00	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	4423	4423	1425	3120	2533	1550	2484	1413	1413	1413
Flt Permitted	1.00	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (perm)	4423	4425	1425	3120	2533	1550	2484	1413	1413	1413
Volume (vph)	10	2205	410	150	1545	3134	280	385	10	35
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	10	2273	423	155	1593	3231	289	397	10	36
RTOR Reduction (vph)	0	0	11	0	0	64	0	1	0	0
Lane Group Flow (vph)	0	2283	567	0	1593	3167	289	406	0	36
Heavy Vehicles (%)	2%	2%	2%	2%	1%	1%	3%	3%	3%	21%
Turn Type	Split	Prot	Prot	Prot	Prot	Prot	pt+ov	pt+ov	pt+ov	pt+ov
Protected Phases	1	1	1	2	1	2	3	2	3	3
Permitted Phases	1	1	1	1	1	1	1	1	1	1
Actuated Green, G (s)	45.5	45.5	45.5	37.5	88.5	16.5	59.5	59.5	59.5	16.5
Effective Green, g (s)	48.0	48.0	48.0	40.0	91.0	23.0	66.0	66.0	66.0	23.0
Actuated g/C Ratio	0.40	0.40	0.40	0.33	0.76	0.19	0.55	0.55	0.55	0.19
Clearance Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	9.5	9.5	9.5	9.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1769	570	1040	1921	297	1366	271	1366	271	570
v/s Ratio Prot	0.52	0.40	0.51	c1.25	c0.19	0.16	0.03	0.03	0.03	0.16
v/s Ratio Perm	1.29	1.00	1.53	1.65	0.97	0.30	0.13	0.13	0.13	0.30
Uniform Delay, d1	36.0	35.9	40.0	14.5	48.2	14.5	40.2	40.2	40.2	14.5
Progression Factor	0.81	0.82	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.81
Incremental Delay, d2	133.8	30.2	244.2	294.3	44.6	0.1	0.2	0.2	0.2	44.6
Delay (s)	163.1	59.5	284.2	308.8	92.8	14.6	45.2	45.2	45.2	92.8
Level of Service	F	E	F	F	F	B	D	D	D	B
Approach Delay (s)	142.1	47.1	47.1	47.1	47.1	45.2	45.2	45.2	45.2	47.1
Approach LOS	F	D	D	D	D	D	D	D	D	D
Intersection Summary										
HCM Average Control Delay	224.7 HCM Level of Service F									
HCM Volume to Capacity ratio	1.51									
Actuated Cycle Length (s)	120.0 Sum of lost time (s) 6.0									
Intersection Capacity Utilization	195.8% ICU Level of Service H									
Analysis Period (min)	15									
! Phase conflict between lane groups.										
c Critical Lane Group										



HCM Signalized Intersection Capacity Analysis  
11: Republican St & 5th Ave

2025 With Alt 3 - AM Peak Hour  
500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	0.97	1.00	0.91	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.95
Frpb, ped/bikes	1.00	0.97	1.00	0.97	1.00	0.99	1.00	0.99	1.00	0.99	1.00	1.00
Flpb, ped/bikes	0.96	1.00	0.75	1.00	1.00	0.99	1.00	0.99	1.00	0.99	1.00	1.00
Flt	1.00	0.85	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.96	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1212	1079	1230	4334	1618	3235						
Flt Permitted	0.96	1.00	0.54	1.00	0.19	1.00						
Satd. Flow (perm)	1212	1079	699	4334	323	3235						
Volume (vph)	0	0	0	31	5	16	15	835	429	54	340	5
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	0	0	0	32	5	16	15	852	438	55	347	5
RTOR Reduction (vph)	0	0	0	0	0	13	0	66	0	0	1	0
Lane Group Flow (vph)	0	0	0	37	3	15	1224	0	55	351	0	0
Confl. Peds. (#/hr)	10	20	20	10	75	20	20	75	20	20	75	75
Heavy Vehicles (%)	0%	0%	0%	33%	33%	33%	7%	7%	7%	7%	7%	7%
Parking (#/hr)	8											
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	6	6	6	6	6	6	6	6	6	6	6	6
Permitted Phases	6	6	6	6	6	6	6	6	6	6	6	6
Actuated Green, G (s)	20.0	20.0	109.0	109.0	109.0	109.0	109.0	109.0	109.0	109.0	109.0	109.0
Effective Green, g (s)	22.0	22.0	112.0	112.0	112.0	112.0	112.0	112.0	112.0	112.0	112.0	112.0
Actuated g/C Ratio	0.16	0.16	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Clearance Time (s)	5.0	5.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	190	170	559	3467	258	2588						
v/s Ratio Prot	0.03	0.00	0.02	0.28	0.17	0.11						
v/s Ratio Perm	0.19	0.01	0.03	0.35	0.21	0.14						
Uniform Delay, d1	51.3	49.8	2.9	3.9	3.4	3.1						
Progression Factor	1.00	1.00	1.46	1.34	1.88	1.81						
Incremental Delay, d2	0.5	0.0	0.1	0.2	1.8	0.1						
Delay (s)	51.8	49.9	4.3	5.5	8.2	5.8						
Level of Service	D	D	A	A	A	A						
Approach Delay (s)	0.0	0.0	51.2	5.4	6.1	6.1						
Approach LOS	A	A	D	A	A	A						
Intersection Summary												
HCM Average Control Delay	7.0											
HCM Volume to Capacity ratio	0.33											
Actuated Cycle Length (s)	140.0											
Intersection Capacity Utilization	58.5%											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis  
12: Harrison St & 5th Ave

2025 With Alt 3 - AM Peak Hour  
500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.87	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	0.78	1.00	0.93	1.00	1.00	1.00	1.00	1.00	1.00
Flt	1.00	0.92	1.00	1.00	0.85	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.95	1.00	1.00	0.96	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	1687	1421	1363	2720	1359	2927						
Flt Permitted	0.69	1.00	0.79	1.00	0.49	1.00						
Satd. Flow (perm)	1221	1421	1120	2720	699	2927						
Volume (vph)	5	5	5	55	10	598	10	656	5	5	376	5
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	5	5	5	60	11	657	11	721	5	5	413	5
RTOR Reduction (vph)	0	4	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	5	6	0	71	657	11	726	0	0	423	0	0
Confl. Peds. (#/hr)	100	100	185	185	115	115	185	115	115	185	185	185
Heavy Vehicles (%)	7%	7%	7%	1%	1%	1%	1%	1%	1%	8%	8%	8%
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	2	2	2	6	6	6	8	8	8	4	4	4
Permitted Phases	2	2	2	6	6	6	8	8	8	4	4	4
Actuated Green, G (s)	36.5	36.5	36.5	36.5	36.5	36.5	93.5	93.5	93.5	93.5	93.5	93.5
Effective Green, g (s)	37.5	37.5	37.5	37.5	37.5	37.5	96.5	96.5	96.5	96.5	96.5	96.5
Actuated g/C Ratio	0.27	0.27	0.27	0.27	0.27	0.27	0.69	0.69	0.69	0.69	0.69	0.69
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	327	381	300	729	482	2018						
v/s Ratio Prot	0.00	0.00	0.00	0.24	0.02	0.25						
v/s Ratio Perm	0.02	0.02	0.02	0.24	0.02	0.36						
Uniform Delay, d1	37.7	37.7	37.7	40.1	49.5	6.9	9.0	7.8				
Progression Factor	1.00	1.00	1.00	1.00	1.00	0.32	0.30	0.34				
Incremental Delay, d2	0.0	0.0	0.0	0.4	14.3	0.1	0.5	0.2				
Delay (s)	37.7	37.7	37.7	40.5	63.8	2.3	3.1	2.9				
Level of Service	D	D	D	D	E	A	A	A				
Approach Delay (s)	37.7			61.5		3.1		2.9				
Approach LOS	D	D	D	E		A		A				
Intersection Summary												
HCM Average Control Delay	25.7											
HCM Volume to Capacity ratio	0.51											
Actuated Cycle Length (s)	140.0											
Intersection Capacity Utilization	62.3%											
Analysis Period (min)	15											
c Critical Lane Group												



# HCM Unsignalized Intersection Capacity Analysis 2025 With Alt 3 - AM Peak Hour 13: Harrison St & Broad St 500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
Sign Control	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Grade	0	0	5	0	0	0	0	340	5	0	1330	812
Volume (veh/h)	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Peak Hour Factor	0	0	6	0	0	0	0	382	6	0	1494	912
Hourly flow rate (vph)	0	0	6	0	0	0	0	382	6	0	1494	912
Pedestrians	20											
Lane Width (ft)	11.0											
Walking Speed (ft/s)	4.0											
Percent Blockage	2											
Right turn flare (veh)												
Median type	None											
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
VC, conflicting volume	2162	2358	1223	1132	2812	194	2427					388
VC1, stage 1 conf vol												
VC2, stage 2 conf vol												
vCu, unblocked vol	2162	2358	1223	1132	2812	194	2427					388
IC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1					4.1
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2					2.2
p0 queue free %	100	100	97	100	100	100	100					100
cM capacity (veh/h)	27	35	171	153	18	821	192					1167
Direction, Lane #	EB1	WB1	NE1	NE2	SW1	SW2						
Volume Total	6	0	255	133	996	1410						
Volume Left	0	0	0	0	0	0						
Volume Right	6	0	0	0	0	0						
cSH	171	1700	1700	1700	1700	1700						
Volume to Capacity	0.03	0.00	0.15	0.08	0.59	0.83						
Queue Length 95th (ft)	3	0	0	0	0	0						
Control Delay (s)	26.7	0.0	0.0	0.0	0.0	0.0						
Lane LOS	D	A										
Approach Delay (s)	26.7	0.0	0.0	0.0	0.0	0.0						
Approach LOS	D	A										
Intersection Summary												
Average Delay							0.1					
Intersection Capacity Utilization							73.5%					
Analysis Period (min)							15					

# HCM Signalized Intersection Capacity Analysis 2025 With Alt 3 - AM Peak Hour 14: 5th Ave & Broad St 500 Fifth Avenue North

Movement	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	12	11	12	12	11	11	11	11	12	11	11	12
Lane Width	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Total Lost time (s)	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Util. Factor	0.99	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt	0.99	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	3177	3298	1150	1586	3172	1631	3255					
Flt Permitted	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (perm)	3177	3298	1150	1586	3172	1631	3255					
Volume (vph)	0	464	35	0	365	91	207	310	0	105	1185	5
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	0	469	35	0	369	92	209	313	0	106	1197	5
RTOR, Reduction (vph)	0	4	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	500	0	0	369	92	209	313	0	106	1202	0
Conf. Peds. (#/hr)	115	85	85	115	130	45	45	130				
Heavy Vehicles (%)	3%	3%	3%	2%	2%	2%	10%	10%	10%	7%	7%	7%
Bus Blockages (#/hr)	0	20	0	0	18	0	0	0	0	0	0	0
Turn Type												
Protected Phases	8			4		5	2			1		6
Permitted Phases												
Actuated Green, G (s)	43.0			43.0		43.0	29.0	47.0		29.0		47.0
Effective Green, g (s)	49.0			49.0		49.0	32.0	50.0		32.0		50.0
Actuated g/C Ratio	0.35			0.35		0.35	0.23	0.36		0.23		0.36
Clearance Time (s)	9.0			9.0		9.0	6.0	6.0		6.0		6.0
Lane Grp Cap (vph)	1112			1154		403	363	1133		373		1163
v/s Ratio Prot	c0.16			0.11		c0.13	0.10	0.10		0.07		c0.37
v/s Ratio Perm						0.08						
v/c Ratio	0.45			0.32		0.23	0.58	0.28		0.28		1.03
Uniform Delay, d1	35.1			33.3		32.1	48.0	32.1		44.6		45.0
Progression Factor	1.04			1.00		0.99	0.97	0.92		1.00		1.00
Incremental Delay, d2	1.3			0.7		1.3	6.5	0.6		1.9		35.4
Delay (s)	37.8			34.0		33.3	53.1	30.1		46.5		80.4
Level of Service	D			C		C	D	C		D		F
Approach Delay (s)				33.8			39.3			77.7		
Approach LOS				C			D			E		
Intersection Summary												
HCM Average Control Delay				56.1			HCM Level of Service			E		
HCM Volume to Capacity ratio				0.70								
Actuated Cycle Length (s)				140.0			Sum of lost time (s)			9.0		
Intersection Capacity Utilization				71.1%			ICU Level of Service			C		
Analysis Period (min)				15								
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis  
15: Denny Way & 1st Avenue

2025 With Alt 3 - AM Peak Hour

500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SBL	SBR	NWL	NWR
Lane Configurations	↕↕↕↕↕↕↕↕↕↕↕									
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Flt Protected	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	3445	3445	3445	3445	3445	3445	3445	3445	3445	3445
Flt Permitted	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (perm)	3445	3445	3445	3445	3445	3445	3445	3445	3445	3445
Volume (vph)	0	2144	275	0	1038	345	0	0	170	10
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	0	2210	284	0	1070	356	0	0	175	10
RTOR Reduction (vph)	0	10	0	0	60	0	0	0	0	0
Lane Group Flow (vph)	0	2484	0	0	1366	0	0	0	175	10
Heavy Vehicles (%)	3%	3%	3%	4%	4%	4%	0%	0%	11%	11%
Parking (#/hr)									0	8
Turn Type	Prot									
Protected Phases	1									
Permitted Phases	2									
Actuated Green, G (s)	89.0									
Effective Green, g (s)	71.0									
Actuated g/C Ratio	0.71									
Clearance Time (s)	5.0									
Lane Grp Cap (vph)	3409									
v/s Ratio Prot	c0.12									
v/s Ratio Perm	c0.12									
v/c Ratio	0.01									
Uniform Delay, d1	0.52									
Progression Factor	0.04									
Incremental Delay, d2	33.7									
Delay (s)	29.9									
Level of Service	1.00									
Approach Delay (s)	5.6									
Approach LOS	30.1									
	D									
	C									
	D									
	D									
Intersection Summary										
HCM Average Control Delay	26.4									
HCM Volume to Capacity ratio	0.89									
Actuated Cycle Length (s)	100.0									
Intersection Capacity Utilization	90.5%									
Analysis Period (min)	15									
Critical Lane Group										

HCM Signalized Intersection Capacity Analysis  
16: Denny Way & Broad St

2025 With Alt 3 - AM Peak Hour

500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NER	NWL	NWR
Lane Configurations	↔	↔		↔	↔	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	12	12	12	11	12	10	12	10
Total Lost time (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	0.95		0.95	0.95	0.95	0.95	0.95	0.95	0.95
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.99	1.00	0.99	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00	0.99	1.00	0.99	1.00	1.00
Flt	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	3359	3359		3285	3285	3145	3145	3303	3361	3361
Flt Permitted	1.00	0.95		0.95	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (perm)	3359	3120		3120	3120	3145	3145	3303	3361	3361
Volume (vph)	0	1230	5	5	1080	5	0	408	40	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	1295	5	5	1137	5	0	429	42	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	7	0	0
Lane Group Flow (vph)	0	1300	0	0	1147	0	0	464	0	0
Conf. Peds. (#/hr)	22	12	12	12	22	18	34	34	34	18
Heavy Vehicles (%)	3%	3%	3%	4%	4%	4%	5%	5%	5%	2%
Bus Blockages (#/hr)	0	4	0	0	10	0	0	0	0	0
Turn Type										
Protected Phases	1				1		2		2	
Permitted Phases										
Actuated Green, G (s)	53.0				53.0		37.0		37.0	
Effective Green, g (s)	55.0				55.0		39.0		39.0	
Actuated g/C Ratio	0.55				0.55		0.39		0.39	
Clearance Time (s)	5.0				5.0		5.0		5.0	
Lane Grp Cap (vph)	1847				1716		1227		1288	
v/s Ratio Prot	c0.39				0.37		0.15		0.19	
v/s Ratio Perm					0.67		0.36		0.49	
Uniform Delay, d1	16.5				16.0		21.8		23.0	
Progression Factor	0.57				0.89		1.00		1.00	
Incremental Delay, d2	0.2				2.0		0.9		1.3	
Delay (s)	9.7				16.3		22.7		24.3	
Level of Service	A				B		C		C	
Approach Delay (s)	9.7				16.3		22.7		53.8	
Approach LOS	A				B		C		D	
Intersection Summary										
HCM Average Control Delay	26.0			HCM Level of Service			C			
HCM Volume to Capacity ratio	0.85									
Actuated Cycle Length (s)	100.0			Sum of lost time (s)			6.0			
Intersection Capacity Utilization	73.8%			ICU Level of Service			D			
Analysis Period (min)	15									
Critical Lane Group										

HCM Signalized Intersection Capacity Analysis  
17: Denny Way & 5th Ave

HCM Signalized Intersection Capacity Analysis  
17: Denny Way & 5th Ave

2025 With Alt 3 - AM Peak Hour  
500 Fifth Avenue North

2025 With Alt 3 - AM Peak Hour  
500 Fifth Avenue North

Movement	EBL	EBT	EBR	EBR2	WBT	WBR	NBL	NBT	NBR	NBR2	SBL2	SBL
Lane Configurations	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	12	12	10	12	12	10	12	12	11	12
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Frpb, ped/bikes	0.99	0.99	0.99	0.99	0.99	0.99	0.99	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt	0.95	0.95	0.95	0.95	0.95	0.95	0.95	1.00	1.00	1.00	0.95	0.95
Flt Protected	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	3178	3032	3032	3032	2905	2905	2905	1752	1752	1752	1752	1752
Flt Permitted	0.95	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95
Satd. Flow (perm)	3021	3032	3032	3032	2905	2905	2905	1752	1752	1752	1752	1752
Volume (vph)	5	795	405	10	830	384	5	65	15	15	74	218
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	5	837	426	11	874	404	5	68	16	16	78	229
RTOR Reduction (vph)	0	0	0	0	45	0	0	15	0	0	0	0
Lane Group Flow (vph)	0	1279	0	0	1233	0	0	90	0	0	0	307
Confl. Peds. (#/hr)	23	8	8	8	23	17	23	8	8	8	3	3
Heavy Vehicles (%)	2%	2%	2%	2%	4%	4%	8%	8%	8%	8%	3%	3%
Bus Blockages (#/hr)	0	4	0	0	2	0	0	11	0	0	0	0
Turn Type	Perm	Perm	Perm	Perm	Split	Split	Split	Split	Split	Split	Split	Split
Protected Phases	1	1	1	1	3	3	3	3	3	3	3	3
Permitted Phases	1	1	1	1	3	3	3	3	3	3	3	3
Actuated Green, G (s)	58.4	58.4	58.4	58.4	7.2	7.2	7.2	7.2	7.2	7.2	19.4	19.4
Effective Green, g (s)	60.4	60.4	60.4	60.4	9.2	9.2	9.2	9.2	9.2	9.2	21.4	21.4
Actuated g/C Ratio	0.60	0.60	0.60	0.60	0.09	0.09	0.09	0.09	0.09	0.09	0.21	0.21
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1825	1831	1831	1831	267	267	267	267	267	267	375	375
v/s Ratio Prot	c0.42	c0.41	c0.41	c0.41	c0.03	c0.03	c0.03	c0.03	c0.03	c0.03	c0.18	c0.18
v/s Ratio Perm	0.70	0.67	0.67	0.67	0.34	0.34	0.34	0.34	0.34	0.34	0.82	0.82
Uniform Delay, d1	13.6	13.2	13.2	13.2	42.5	42.5	42.5	42.5	42.5	42.5	37.5	37.5
Progression Factor	0.20	0.87	0.87	0.87	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.1	1.9	1.9	1.9	0.8	0.8	0.8	0.8	0.8	0.8	13.0	13.0
Delay (s)	4.8	4.8	4.8	4.8	43.3	43.3	43.3	43.3	43.3	43.3	50.5	50.5
Level of Service	A	A	A	A	B	B	B	B	B	B	D	D
Approach Delay (s)	4.8	4.8	4.8	4.8	43.3	43.3	43.3	43.3	43.3	43.3	50.5	50.5
Approach LOS	A	A	A	A	B	B	B	B	B	B	D	D
Intersection Summary												
HCM Average Control Delay	15.4											
HCM Volume to Capacity ratio	0.69											
Actuated Cycle Length (s)	100.0											
Intersection Capacity Utilization	68.7%											
Analysis Period (min)	15											
c Critical Lane Group												

M:\05105050 IRIS\Scoping\NOV-2005\With Mercer Street Access\2025\_With-Project AM\_Low sy\Synchro 6 Report  
The Transpo Group  
1/17/06

Movement	SBT	SBR
Lane Configurations	↑	↑
Ideal Flow (vphpl)	1900	1900
Lane Width	13	12
Total Lost time (s)	3.0	3.0
Lane Util. Factor	1.00	1.00
Frpb, ped/bikes	0.99	0.99
Flpb, ped/bikes	1.00	1.00
Flt	0.98	0.98
Flt Protected	1.00	1.00
Satd. Flow (prot)	1860	1860
Flt Permitted	1.00	1.00
Satd. Flow (perm)	1860	1860
Volume (vph)	105	15
Peak-hour factor, PHF	0.95	0.95
Adj. Flow (vph)	111	16
RTOR Reduction (vph)	6	0
Lane Group Flow (vph)	121	0
Confl. Peds. (#/hr)	17	17
Heavy Vehicles (%)	3%	3%
Bus Blockages (#/hr)	0	0
Turn Type	Prot	Prot
Protected Phases	2	2
Permitted Phases	2	2
Actuated Green, G (s)	19.4	19.4
Effective Green, g (s)	21.4	21.4
Actuated g/C Ratio	0.21	0.21
Clearance Time (s)	5.0	5.0
Vehicle Extension (s)	3.0	3.0
Lane Grp Cap (vph)	398	398
v/s Ratio Prot	0.07	0.07
v/s Ratio Perm	0.31	0.31
Uniform Delay, d1	33.0	33.0
Progression Factor	1.00	1.00
Incremental Delay, d2	0.4	0.4
Delay (s)	33.5	33.5
Level of Service	C	C
Approach Delay (s)	45.5	45.5
Approach LOS	D	D
Intersection Summary		

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The Transpo Group  
1/17/06

HCM Signalized Intersection Capacity Analysis  
 18: Denny Way & Aurora Ave

HCM Signalized Intersection Capacity Analysis  
 18: Denny Way & Aurora Ave

2025 With Alt 3 - AM Peak Hour  
 500 Fifth Avenue North

Movement	EBT	EBR	EBR2	WBT	WBR	NBT	NBR	NBR2	SBL2	SBL	SBT	SBR
Lane Configurations	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	11	12	11	12	12	12	12	12	12	12
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Flt Protected	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Satd. Flow (prot)	3019	2966	3091	3091	3091	3091	3091	3091	3091	3091	3091	3091
Flt Permitted	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (perm)	3019	2966	3091	3091	3091	3091	3091	3091	3091	3091	3091	3091
Volume (vph)	1039	150	5	1170	160	325	75	5	385	185	0	895
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	1094	158	5	1232	168	342	79	5	405	195	0	942
RTOR Reduction (vph)	0	0	0	11	0	0	0	0	0	0	0	1
Lane Group Flow (vph)	1257	0	0	1389	0	426	0	0	0	600	479	478
Heavy Vehicles (%)	2%	2%	2%	4%	4%	2%	2%	2%	3%	3%	3%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	2	2	2	4	4	4	4	4	4	4	4	4
Permitted Phases	28.3	28.3	28.3	17.7	17.7	17.7	17.7	17.7	17.7	17.7	17.7	17.7
Actuated Green, G (s)	34.3	34.3	34.3	19.7	19.7	19.7	19.7	19.7	19.7	19.7	19.7	19.7
Effective Green, g (s)	0.34	0.34	0.34	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
Actuated g/C Ratio	9.0	9.0	9.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Clearance Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Vehicle Extension (s)	1017	1017	1017	609	609	609	609	609	609	609	609	609
Lane Grp Cap (vph)	0.42	0.42	0.42	c0.47	c0.47	c0.47	c0.47	c0.47	c0.47	c0.47	c0.47	c0.47
v/s Ratio Prot	1.21	1.21	1.21	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37
v/s Ratio Perm	32.8	32.8	32.8	37.4	37.4	37.4	37.4	37.4	37.4	37.4	37.4	37.4
Uniform Delay, d1	1.13	1.13	1.13	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62
Progression Factor	104.8	104.8	104.8	169.2	169.2	169.2	169.2	169.2	169.2	169.2	169.2	169.2
Incremental Delay, d2	142.1	142.1	142.1	189.7	189.7	189.7	189.7	189.7	189.7	189.7	189.7	189.7
Delay (s)	F	F	F	F	F	F	F	F	F	F	F	F
Level of Service	F	F	F	D	D	D	D	D	D	D	D	D
Approach Delay (s)	142.1	142.1	142.1	189.7	189.7	189.7	189.7	189.7	189.7	189.7	189.7	189.7
Approach LOS	F	F	F	D	D	D	D	D	D	D	D	D
Intersection Summary												
HCM Average Control Delay	112.2											
HCM Volume to Capacity ratio	1.08											
Actuated Cycle Length (s)	100.0											
Intersection Capacity Utilization	99.5%											
Analysis Period (min)	15											
c Critical Lane Group												



Movement	SBR2
Lane Configurations	
Ideal Flow (vphpl)	1900
Lane Width	12
Total Lost time (s)	
Lane Util. Factor	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Volume (vph)	15
Peak-hour factor, PHF	0.95
Adj. Flow (vph)	16
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Heavy Vehicles (%)	3%
Bus Blockages (#/hr)	0
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	
Intersection Summary	

HCM Signalized Intersection Capacity Analysis  
 19: Denny Way & Dexter Avenue  
 2025 With Alt 3 - AM Peak Hour  
 500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↕↕	↕↕		↕↕	↕↕		↕↕	↕↕		↕↕	↕↕	↕↕
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	12	11	12	11	12	11	12	11	12	12
Total Lost time (s)		3.0		3.0		3.0		3.0		3.0		3.0
Lane Util. Factor		0.95		0.95		0.95		0.95		1.00		0.95
Flt Protected		0.99		0.98		0.98		0.97		1.00		0.99
Flt Permitted		1.00		1.00		1.00		1.00		0.95		1.00
Satd. Flow (prot)		3059		2965		2965		2837		1624		3204
Flt Permitted		1.00		1.00		1.00		0.95		0.33		1.00
Satd. Flow (perm)		3059		2965		2965		2704		568		3204
Volume (vph)	0	1469	65	0	1116	155	5	335	95	130	150	15
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	1530	68	0	1162	161	5	349	99	135	156	16
RTOR Reduction (vph)	0	3	0	0	9	0	0	27	0	0	8	0
Lane Group Flow (vph)	0	1595	0	0	1314	0	0	426	0	135	164	0
Heavy Vehicles (%)	2%	2%	2%	4%	4%	4%	7%	7%	7%	0%	0%	0%
Turn Type		1			1			2			2	
Protected Phases												
Permitted Phases												
Actuated Green, G (s)		66.2			66.2			23.8		23.8		23.8
Effective Green, g (s)		68.2			68.2			25.8		25.8		25.8
Actuated g/C Ratio		0.68			0.68			0.26		0.26		0.26
Clearance Time (s)		5.0			5.0			5.0		5.0		5.0
Vehicle Extension (s)		3.0			3.0			3.0		3.0		3.0
Lane Grp Cap (vph)		2086			2022			698		147		827
v/s Ratio Prot		c0.52			0.44					c0.24		0.05
v/s Ratio Perm								0.16				
v/c Ratio		0.76			0.65			0.61		0.92		0.20
Uniform Delay, d1		10.6			9.1			32.7		36.1		29.0
Progression Factor		1.00			1.00			1.18		1.00		1.00
Incremental Delay, d2		2.7			1.6			1.5		50.0		0.1
Delay (s)		13.3			10.7			40.0		86.0		29.1
Level of Service		B			B			D		F		C
Approach Delay (s)		13.3			10.7			40.0				54.2
Approach LOS		B			B			D				D
Intersection Summary												
HCM Average Control Delay	19.1 HCM Level of Service B											
HCM Volume to Capacity ratio	0.81											
Actuated Cycle Length (s)	100.0 Sum of lost time (s) 6.0											
Intersection Capacity Utilization	79.2% ICU Level of Service D											
Analysis Period (min)	15											
Critical Lane Group												

HCM Signalized Intersection Capacity Analysis  
 20: Denny Way & Westlake Ave  
 2025 With Alt 3 - AM Peak Hour  
 500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↕↕											
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)	3.0											
Lane Util. Factor	0.95											
Flt Protected	0.99											
Satd. Flow (prot)	3059											
Flt Permitted	1.00											
Satd. Flow (perm)	3059											
Volume (vph)	0	1469	65	0	1	0	1	0	1	0	1	0
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	1530	68	0	1	0	1	0	1	0	1	0
RTOR Reduction (vph)	0	3	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	1595	0	0	1	0	1	0	1	0	1	0
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	4%
Turn Type												
Protected Phases	1											
Permitted Phases												
Actuated Green, G (s)	66.2											
Effective Green, g (s)	68.2											
Actuated g/C Ratio	0.68											
Clearance Time (s)	5.0											
Vehicle Extension (s)	3.0											
Lane Grp Cap (vph)	2086											
v/s Ratio Prot	c0.52											
v/s Ratio Perm	0.76											
v/c Ratio	10.6											
Uniform Delay, d1	1.00											
Progression Factor	2.7											
Incremental Delay, d2	13.3											
Delay (s)	B											
Level of Service	B											
Approach Delay (s)	13.3											
Approach LOS	B											
Intersection Summary												
HCM Average Control Delay	19.1											
HCM Volume to Capacity ratio	0.81											
Actuated Cycle Length (s)	100.0											
Intersection Capacity Utilization	79.2%											
Analysis Period (min)	15											
c Critical Lane Group												



HCM Signalized Intersection Capacity Analysis  
21: Denny Way & Fairview Ave

2025 With Alt 3 - AM Peak Hour

500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↶	↷		↶	↷		↶	↷		↶	↷	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	12	11	11	12	9	10	12	10	10	12
Total Lost time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		0.97	0.95		1.00	0.95	
Fit	1.00	1.00		1.00	0.98		1.00	0.98		1.00	0.95	
Fit Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1555	3099		1540	3008		2781	2901		1458	2771	
Fit Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1555	3099		1540	3008		2781	2901		1458	2771	
Volume (vph)	165	841	20	45	987	180	404	335	65	115	365	180
Peak-hour factor, PHF	0.94	0.94		0.94	0.94		0.94	0.94		0.94	0.94	
Adj. Flow (vph)	176	895	21	48	1050	191	430	356	69	122	388	191
RTOR Reduction (vph)	0	1	0	0	15	0	0	17	0	0	63	0
Lane Group Flow (vph)	176	915	0	48	1226	0	430	408	0	122	516	0
Heavy Vehicles (%)	1%	1%	1%	2%	2%	2%	2%	2%	2%	4%	4%	4%
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	1	6	5	2	3	8	7	4				
Permitted Phases												
Actuated Green, G (s)	12.2	37.9	5.3	31.0	15.0	27.8	9.0	21.8				
Effective Green, g (s)	14.2	39.9	7.3	33.0	17.0	29.8	11.0	23.8				
Actuated g/C Ratio	0.14	0.40	0.07	0.33	0.17	0.30	0.11	0.24				
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	221	1237	112	983	473	864	160	659				
v/s Ratio Prot	c0.11	0.30	0.03	c0.41	c0.15	0.14	0.08	c0.19				
v/s Ratio Perm												
v/c Ratio	0.80	0.74	0.43	1.23	0.91	0.47	0.76	0.78				
Uniform Delay, d1	41.5	25.6	44.4	33.5	40.7	28.7	43.2	35.7				
Progression Factor	1.00	1.00	1.14	0.98	1.00	1.00	1.09	0.79				
Incremental Delay, d2	17.8	4.0	1.6	111.3	21.1	0.4	17.8	5.6				
Delay (s)	59.3	29.6	52.0	144.1	61.8	29.1	64.9	33.8				
Level of Service	E	C	D	F	E	C	E	C		E	C	
Approach Delay (s)	34.4			140.7		45.6	39.3					
Approach LOS	C			F		D	D					
Intersection Summary												
HCM Average Control Delay	72.5											
HCM Volume to Capacity ratio	0.98											
Actuated Cycle Length (s)	100.0											
Intersection Capacity Utilization	90.6%											
Analysis Period (min)	15											
Critical Lane Group	E											

2025 With Alt 3 - AM Peak Hour

500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑↑			↑			↑↑↑					
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	0.86	0.86	0.86	0.86	0.86	0.86
Lane Util. Factor	0.95	1.00	1.00	1.00	1.00	1.00	0.99	0.99	0.99	0.99	0.99	0.99
Fit Protected	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	2961	1593	1676	1593	1676	1593	1593	1676	1593	1676	1593	1676
Fit Permitted	1.00	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (perm)	2961	1593	1676	1593	1676	1593	1593	1676	1593	1676	1593	1676
Volume (vph)	0	539	287	605	1137	0	0	0	0	205	2150	185
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	561	299	630	1184	0	0	0	0	214	2240	193
RTOR Reduction (vph)	0	26	0	0	0	0	0	0	0	0	12	0
Lane Group Flow (vph)	0	834	0	630	1184	0	0	0	0	0	2635	0
Heavy Vehicles (%)	4%	4%	4%	2%	2%	2%	0%	0%	0%	5%	5%	5%
Turn Type	Prot			Prot			Split					
Protected Phases	3			2 2 3			1 1 1					
Permitted Phases												
Actuated Green, G (s)	20.5			29.5 54.5			36.5					
Effective Green, g (s)	22.0			31.0 56.0			38.0					
Actuated g/C Ratio	0.22			0.31 0.56			0.38					
Clearance Time (s)	4.5			4.5			4.5					
Vehicle Extension (s)	3.0			3.0			3.0					
Lane Grp Cap (vph)	651			494 939			2097					
v/s Ratio Prot	0.28			c0.71			c0.48					
v/s Ratio Perm												
v/c Ratio	1.28			1.28 1.26			1.26					
Uniform Delay, d1	39.0			34.5 22.0			31.0					
Progression Factor	0.98			1.00 1.00			0.86					
Incremental Delay, d2	137.6			138.9 126.0			119.1					
Delay (s)	175.6			173.4 148.0			145.9					
Level of Service	F			F			F					
Approach Delay (s)	175.6			156.9			0.0 145.9					
Approach LOS	F			F			A F					
Intersection Summary												
HCM Average Control Delay	154.4			HCM Level of Service			F					
HCM Volume to Capacity ratio	1.26											
Actuated Cycle Length (s)	100.0			Sum of lost time (s)			6.0					
Intersection Capacity Utilization	115.5%			ICU Level of Service			H					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis  
23: Yale St & Stewart St

2025 With Alt 3 - AM Peak Hour  
500 Fifth Avenue North

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations		↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	1.00
Fit	1.00	0.85	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fit Protected	1.00	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1660	1411	1624	1710	1710	1710	1710	1710	1710	1710	1562	4489
Fit Permitted	1.00	1.00	0.36	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1660	1411	609	1710	1710	1710	1710	1710	1710	1710	1562	4489
Volume (vph)	0	237	50	35	10	0	0	0	0	0	615	2140
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	0	242	51	36	10	0	0	0	0	0	628	2184
RTOR Reduction (vph)	0	0	13	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	242	38	36	10	0	0	0	0	0	628	2184
Heavy Vehicles (%)	3%	3%	3%	0%	0%	0%	0%	0%	0%	0%	4%	4%
Turn Type		Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	3	3	3	3	3	3	3	3	3	3	3	3
Permitted Phases												
Actuated Green, G (s)	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5
Effective Green, g (s)	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0
Actuated g/C Ratio	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	365	310	134	376	376	376	376	376	376	376	1125	3232
v/s Ratio Prot	c0.15										c0.49	
v/s Ratio Perm		0.03	0.06								0.40	
v/c Ratio	0.66	0.12	0.27	0.03							0.56	0.68
Uniform Delay, d1	35.6	31.3	32.3	30.6							6.6	7.6
Progression Factor	0.99	1.10	0.34	0.30							0.33	0.38
Incremental Delay, d2	3.8	0.1	1.0	0.0							0.2	0.1
Delay (s)	38.9	34.6	12.0	9.1							2.4	3.0
Level of Service	D	C	B	A							A	A
Approach Delay (s)	38.2			11.4					0.0		A	2.9
Approach LOS	D			B					A		A	A
Intersection Summary												
HCM Average Control Delay		6.3							HCM Level of Service		A	
HCM Volume to Capacity ratio		0.67										
Actuated Cycle Length (s)		100.0							Sum of lost time (s)		6.0	
Intersection Capacity Utilization		73.1%							ICU Level of Service		D	
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis  
24: Yale St & Howell St

2025 With Alt 3 - AM Peak Hour  
500 Fifth Avenue North

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR	
Lane Configurations	↖	↗	↘	↙	↘	↙	↖	↗	↘	↙	↖	↗	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	3.0	3.0						3.0	3.0				
Lane Util. Factor	1.00	1.00						0.95	1.00				
Fr	1.00	0.99						1.00	0.85				
Fit Protected								0.99	1.00				
Satd. Flow (prot)	1593	1334						2778	1253				
Fit Permitted	0.95	1.00						0.76	1.00				
Satd. Flow (perm)	1593	1334						2129	1253				
Volume (vph)	15	802	30	0	0	0	40	205	480	0	385	5	
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	
Adj. Flow (vph)	17	933	35	0	0	0	47	238	558	0	448	6	
RTOR Reduction (vph)	0	1	0	0	0	0	0	0	71	0	1	0	
Lane Group Flow (vph)	17	967	0	0	0	0	0	285	487	0	453	0	
Heavy Vehicles (%)	2%	2%	2%	0%	0%	0%	0%	16%	16%	1%	1%	1%	
Parking (#/hr)		20											
Turn Type	Split												
Protected Phases	2	2						1	1			1	
Permitted Phases								1					
Actuated Green, G (s)	53.0	53.0						37.0	37.0			37.0	
Effective Green, g (s)	55.0	55.0						39.0	39.0			39.0	
Actuated g/C Ratio	0.55	0.55						0.39	0.39			0.39	
Clearance Time (s)	5.0	5.0						5.0	5.0			5.0	
Vehicle Extension (s)	3.0	3.0						3.0	3.0			3.0	
Lane Grp Cap (vph)	876	734						830	489			659	
v/s Ratio Prot	0.01	c0.72							c0.39			0.27	
v/s Ratio Perm								0.13					
v/c Ratio	0.02	1.32						0.34	1.00			0.69	
Uniform Delay, d1	10.2	22.5						21.5	30.4			25.4	
Progression Factor	0.62	0.74						1.00	1.00			1.00	
Incremental Delay, d2	0.0	151.0						1.1	39.8			5.8	
Delay (s)	6.3	167.7						22.6	70.3			31.2	
Level of Service	A	F						C	E			C	
Approach Delay (s)		164.9						54.1				31.2	
Approach LOS		F						A				C	
Intersection Summary													
HCM Average Control Delay			97.4					HCM Level of Service					F
HCM Volume to Capacity ratio			1.18										
Actuated Cycle Length (s)			100.0					Sum of lost time (s)					6.0
Intersection Capacity Utilization			93.5%					ICU Level of Service					F
Analysis Period (min)			15										
Critical Lane Group													



HCM Unsignalized Intersection Capacity Analysis  
25: Harrison St & Site Access

2025 With Alt 3 - AM Peak Hour  
500 Fifth Avenue North

Movement	EBL	EBT	WBT	WBR	SBL	SBR	
Lane Configurations	↑	↑↑	↑↑	↑↑	↑	↑	
Sign Control	Free	Free	Free	Free	Stop	Stop	
Grade	0%	0%	0%	0%	0%	0%	
Volume (veh/h)	0	15	860	356	0	3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Hourly flow rate (vph)	0	16	717	387	0	3	
Pedestrians							
Lane Width (ft)							
Walking Speed (ft/s)							
Percent Blockage							
Right turn flare (veh)							
Median type					None		
Median storage (veh)							
Upstream signal (ft)			155				
pX, platoon unblocked							
VC, conflicting volume	1104				927	433	
VC1, stage 1 conf vol							
VC2, stage 2 conf vol	1104				927	433	
VCu, unblocked vol							
tC, single (s)	4.1				6.8	6.9	
tC, 2 stage (s)							
tF (s)	2.2				3.5	3.3	
p0 queue free %	100				100	99	
cM capacity (veh/h)	628				267	571	
Direction, Lane #	EB1	WB1	WB2	WB3	SB1	SB1	
Volume Total	16	287	287	530	3	3	
Volume Left	0	0	0	0	0	0	
Volume Right	0	0	0	387	3	3	
cSH	1700	1700	1700	1700	571	571	
Volume to Capacity	0.01	0.17	0.17	0.31	0.01	0.01	
Queue Length 95th (ft)	0	0	0	0	0	0	
Control Delay (s)	0.0	0.0	0.0	0.0	11.3	11.3	
Lane LOS					B	B	
Approach Delay (s)	0.0	0.0			11.3		
Approach LOS					B		
Intersection Summary							
Average Delay			0.0				
Intersection Capacity Utilization			30.7%				A
Analysis Period (min)			15				

HCM Unsignalized Intersection Capacity Analysis  
26: Mercer St & Site Driveway

2025 With Alt 3 - AM Peak Hour  
500 Fifth Avenue North

Movement	EBT	EBR	WBT	WBR	NBT	NBR	
Lane Configurations	↑↑↑	↑↑↑	↑↑↑	↑↑↑	↑	↑	
Sign Control	Free	Free	Free	Free	Stop	Stop	
Grade	0%	0%	0%	0%	0%	0%	
Volume (veh/h)	1607	66	0	0	0	25	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	
Hourly flow rate (vph)	1786	73	0	0	0	28	
Pedestrians							
Lane Width (ft)							
Walking Speed (ft/s)							
Percent Blockage							
Right turn flare (veh)							
Median type					None		
Median storage (veh)							
Upstream signal (ft)	644				646		
pX, platoon unblocked							
VC, conflicting volume			1859		1822	483	
VC1, stage 1 conf vol							
VC2, stage 2 conf vol							
VCu, unblocked vol			1859		1822	483	
tC, single (s)			4.1		6.8	6.9	
tC, 2 stage (s)							
tF (s)			2.2		3.5	3.3	
p0 queue free %			100		100	95	
cM capacity (veh/h)			321		69	530	
Direction, Lane #	EB1	EB2	EB3	EB4	NB1	NB1	
Volume Total	510	510	510	328	28	28	
Volume Left	0	0	0	0	0	0	
Volume Right	0	0	0	73	28	28	
cSH	1700	1700	1700	1700	530	530	
Volume to Capacity	0.30	0.30	0.30	0.19	0.05	0.05	
Queue Length 95th (ft)	0	0	0	0	0	4	
Control Delay (s)	0.0	0.0	0.0	0.0	12.2	12.2	
Lane LOS					B	B	
Approach Delay (s)	0.0				12.2		
Approach LOS					B		
Intersection Summary							
Average Delay			0.2				
Intersection Capacity Utilization			34.4%				A
Analysis Period (min)			15				

HCM Signalized Intersection Capacity Analysis  
 1: Roy St & 5th Ave

HCM Signalized Intersection Capacity Analysis  
 2: Broad St & 9th Ave

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	12	12	12	12	12	12	12	12	12	12	12	12
Lane Width	11	11	11	11	11	11	11	11	11	11	11	11
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	0.98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt	0.99	1.00	0.97	1.00	0.97	1.00	0.96	1.00	0.96	1.00	0.96	1.00
Flt Protected	0.98	0.98	0.95	0.99	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95
Satd. Flow (prot)	1378	1378	1641	1414	1641	1414	1646	1417	1646	1417	1646	1417
Flt Permitted	0.98	0.95	0.99	0.95	0.99	0.95	1.00	0.95	0.95	1.00	0.95	0.95
Satd. Flow (perm)	1378	1641	1414	1641	1414	1641	1417	1641	1414	1641	1417	1641
Volume (vph)	0	0	0	44	60	5	679	345	90	10	200	70
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	48	65	5	738	375	98	11	217	76
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	116	0	645	557	0	11	278	0
Conf. Peds. (#/hr)	0	0	0	20	20	20	20	20	20	20	20	20
Heavy Vehicles (%)	0%	0%	0%	2%	2%	2%	1%	1%	1%	6%	6%	6%
Parking (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Turn Type	Perm	Perm	Perm	Split	Split	Split	Split	Split	Split	Split	Split	Split
Protected Phases	6	6	6	4	4	4	4	4	4	4	4	4
Permitted Phases	6	6	6	4	4	4	4	4	4	4	4	4
Actuated Green, G (s)	17.0	17.0	27.0	27.0	27.0	27.0	18.0	18.0	18.0	18.0	18.0	18.0
Effective Green, g (s)	20.0	20.0	30.0	30.0	30.0	30.0	21.0	21.0	21.0	21.0	21.0	21.0
Actuated g/C Ratio	0.25	0.25	0.38	0.38	0.38	0.38	0.26	0.26	0.26	0.26	0.26	0.26
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lane Grp Cap (vph)	345	345	615	530	432	372	432	372	432	372	432	372
vis Ratio Prot	0.08	0.34	1.05	1.05	1.05	1.05	0.03	0.75	0.03	0.75	0.03	0.75
vis Ratio Perm	0.34	0.34	1.05	1.05	1.05	1.05	0.03	0.75	0.03	0.75	0.03	0.75
Uniform Delay, d1	24.6	24.6	25.0	25.0	25.0	25.0	21.9	21.9	21.9	21.9	21.9	21.9
Progression Factor	1.00	1.00	0.20	0.20	0.20	0.20	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.6	2.6	26.6	27.8	27.8	27.8	0.1	12.8	0.1	12.8	0.1	12.8
Delay (s)	27.2	27.2	31.6	32.7	32.7	32.7	22.0	39.8	22.0	39.8	22.0	39.8
Level of Service	C	C	C	C	C	C	C	C	C	C	C	C
Approach Delay (s)	0.0	0.0	27.2	32.1	32.1	32.1	39.2	39.2	39.2	39.2	39.2	39.2
Approach LOS	A	A	C	C	C	C	D	D	D	D	D	D
Intersection Summary												
HCM Average Control Delay	33.1	33.1	HCM Level of Service	C	C	C	C	C	C	C	C	C
HCM Volume to Capacity ratio	0.76	0.76										
Actuated Cycle Length (s)	80.0	80.0	Sum of lost time (s)	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0
Intersection Capacity Utilization	66.9%	66.9%	ICU Level of Service	C	C	C	C	C	C	C	C	C
Analysis Period (min)	15	15										
c Critical Lane Group												

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 The Transpo Group  
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Movement	EBT	EBR	WBL	WBT	WBR	SBL	SBT	SBR	SBR2
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	11	12	10	10	11	12	9	8	12
Lane Width	11	12	10	10	11	12	9	8	12
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	1.00	0.95	0.95	0.95	0.95	0.91	1.00	0.95
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt	0.93	1.00	0.99	1.00	0.99	1.00	0.95	1.00	0.95
Flt Protected	1.00	0.95	1.00	1.00	0.99	1.00	0.99	1.00	0.99
Satd. Flow (prot)	2930	1516	2997	2997	3847	1247	3847	1247	2930
Flt Permitted	1.00	0.23	1.00	1.00	0.99	1.00	0.99	1.00	0.99
Satd. Flow (perm)	2930	368	2997	2997	3847	1247	3847	1247	2930
Volume (vph)	365	295	190	1707	145	155	1035	229	5
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	376	304	196	1760	149	160	1067	236	5
RTOR Reduction (vph)	121	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	559	0	196	1909	0	0	1227	240	0
Conf. Peds. (#/hr)	50	50	50	50	50	50	50	50	50
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	1%	1%	1%
Bus Blockages (#/hr)	0	0	0	0	0	0	2	0	0
Parking (#/hr)	0	0	0	0	0	0	20	0	0
Turn Type	1	2	1	2	3	3	3	3	3
Protected Phases	1	2	1	2	3	3	3	3	3
Permitted Phases	1	2	1	2	3	3	3	3	3
Actuated Green, G (s)	37.5	62.5	68.5	68.5	39.5	39.5	39.5	39.5	39.5
Effective Green, g (s)	40.5	68.5	71.5	71.5	42.5	42.5	42.5	42.5	42.5
Actuated g/C Ratio	0.34	0.57	0.60	0.60	0.35	0.35	0.35	0.35	0.35
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	989	478	1786	1786	1362	442	1362	442	989
vis Ratio Prot	0.19	0.10	c0.64	c0.64	c0.32	0.19	c0.32	0.19	0.19
vis Ratio Perm	0.19	0.10	c0.64	c0.64	c0.32	0.19	c0.32	0.19	0.19
v/c Ratio	0.57	0.41	1.07	1.07	0.90	0.54	0.90	0.54	0.57
Uniform Delay, d1	32.5	26.4	24.2	24.2	36.8	31.0	36.8	31.0	32.5
Progression Factor	1.00	0.29	0.24	0.24	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.3	0.1	32.3	32.3	8.5	1.4	8.5	1.4	2.3
Delay (s)	34.9	7.6	38.2	38.2	45.2	32.4	45.2	32.4	34.9
Level of Service	C	A	D	D	D	C	D	C	C
Approach Delay (s)	34.9	35.3	43.1	43.1	43.1	43.1	43.1	43.1	34.9
Approach LOS	C	D	D	D	D	D	D	D	C
Intersection Summary									
HCM Average Control Delay	37.9	37.9	HCM Level of Service	D	D	D	D	D	D
HCM Volume to Capacity ratio	1.01	1.01							
Actuated Cycle Length (s)	120.0	120.0	Sum of lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0
Intersection Capacity Utilization	89.9%	89.9%	ICU Level of Service	E	E	E	E	E	E
Analysis Period (min)	15	15							
c Critical Lane Group									

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 The Transpo Group  
 1/17/06

HCM Signalized Intersection Capacity Analysis  
3: Broad St & Westlake Ave

2025 With Alt 3 - PM Peak Hour

500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4T	1P		4T	1P		4T	1P		4T	1P	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	12	12	10	12	12	10	12	12	12	12
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00
Flpb, ped/bikes	0.98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.96	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.97	1.00	1.00	0.85	1.00	0.94	1.00	1.00	1.00	1.00	1.00	1.00
Flt Permitted	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	2962	1624	3032	1454	1548	2818	1624	1710				
Flt Permitted	0.73	0.40	1.00	1.00	0.37	1.00	0.10	1.00				
Satd. Flow (perm)	2168	681	3032	1454	595	2818	163	1710				
Volume (vph)	15	435	90	110	1922	1130	185	755	525	50	315	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	16	458	95	116	2023	1189	195	795	553	53	332	0
RTOR Reduction (vph)	0	14	0	0	0	21	0	105	0	0	0	0
Lane Group Flow (vph)	0	555	0	116	2023	1168	195	1243	0	53	332	0
Conf. Ped. (#/hr)			50			50						
Heavy Vehicles (%)	1%	1%	1%	0%	0%	0%	1%	1%	1%	0%	0%	0%
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	2	2	2	2	1	1						1
Permitted Phases	2	2	2	2	1	1						1
Actuated Green, G (s)	69.5	69.5	69.5	69.5	39.5	39.5						39.5
Effective Green, g (s)	72.0	72.0	72.0	72.0	42.0	42.0						42.0
Actuated g/C Ratio	0.60	0.60	0.60	0.60	0.35	0.35						0.35
Clearance Time (s)	5.5	5.5	5.5	5.5	5.5	5.5						5.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0						3.0
Lane Grp Cap (vph)	1301	409	1819	872	208	986						57
v/s Ratio Prot		0.67				c0.44						0.19
v/s Ratio Perm	0.26	0.17	0.17	0.80	0.33							0.33
v/c Ratio	0.43	0.28	1.11	1.34	0.94	1.26						0.93
Uniform Delay, d1	12.9	11.6	24.0	24.0	37.7	39.0						37.6
Progression Factor	0.61	0.85	0.71	0.70	0.49	0.40						1.00
Incremental Delay, d2	0.2	0.3	56.2	158.0	8.9	118.2						100.2
Delay (s)	8.0	10.0	73.4	174.9	27.2	133.7						137.8
Level of Service	A	B	E	F	C	F						D
Approach Delay (s)	8.0		107.5			120.2						49.3
Approach LOS	A		F			F						D
Intersection Summary												
HCM Average Control Delay												
HCM Volume to Capacity ratio												
Actuated Cycle Length (s)												
Intersection Capacity Utilization												
Analysis Period (min)												
Critical Lane Group												

HCM Signalized Intersection Capacity Analysis  
4: Valley St & Fairview Ave

2025 With Alt 3 - PM Peak Hour

500 Fifth Avenue North

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	4T	1P	4T	1P	4T	1P
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	10	12	12	12	12	12
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	1.00	1.00	1.00	0.94	1.00
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3002	1151	812	3217	4536	1439
Flt Permitted	1.00	1.00	0.15	1.00	0.95	1.00
Satd. Flow (perm)	3002	1151	131	3217	4536	1439
Volume (vph)	830	55	5	995	2042	390
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	847	56	5	1015	2084	398
RTOR Reduction (vph)	0	11	0	0	0	17
Lane Group Flow (vph)	847	45	5	1015	2084	381
Heavy Vehicles (%)	1%	1%	100%	1%	1%	1%
Parking (#/hr)	20					
Turn Type	Perm	Perm	D+P	Perm	D+P	Perm
Protected Phases	4	3	3	4	2	2
Permitted Phases	4	3	3	4	2	2
Actuated Green, G (s)	40.0	40.0	49.0	54.0	56.0	70.0
Effective Green, g (s)	42.0	42.0	53.0	56.0	58.0	72.0
Actuated g/C Ratio	0.35	0.35	0.44	0.47	0.48	0.60
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1051	403	120	1501	2192	863
v/s Ratio Prot	c0.28		0.00	c0.32	c0.46	0.26
v/s Ratio Perm	0.81	0.11	0.04	0.68	0.95	0.44
Uniform Delay, d1	35.3	26.4	21.0	24.9	29.6	13.1
Progression Factor	1.23	1.40	1.00	1.00	1.02	1.02
Incremental Delay, d2	4.4	0.4	0.1	1.2	1.3	0.0
Delay (s)	47.8	37.2	21.1	26.2	31.5	13.3
Level of Service	D	D	C	C	C	B
Approach Delay (s)	47.2			26.1	28.5	
Approach LOS	D			C	C	
Intersection Summary						
HCM Average Control Delay						
HCM Volume to Capacity ratio						
Actuated Cycle Length (s)						
Intersection Capacity Utilization						
Analysis Period (min)						
Critical Lane Group						

HCM Signalized Intersection Capacity Analysis  
 5: Mercer St & 1st Avenue

2025 With Alt 3 - PM Peak Hour

500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4↑						4↑					
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0					3.0	3.0				
Lane Util. Factor	0.95	1.00					1.00	0.95				
Flt	1.00	1.00					1.00	0.93				
Flt Protected	1.00						0.95	1.00				
Satd. Flow (prot)	3525						1736	3242				
Flt Permitted	1.00						0.95	1.00				
Satd. Flow (perm)	3525						1736	3242				
Volume (vph)	105	1200	0	0	0	0	160	445	350	0	0	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	111	1263	0	0	0	0	168	468	368	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	15	0	0	0	0
Lane Group Flow (vph)	0	1374	0	0	0	0	168	821	0	0	0	0
Heavy Vehicles (%)	2%	2%	2%	0%	0%	0%	4%	4%	4%	0%	0%	0%
Turn Type	Perm	Perm					Perm	Perm				
Protected Phases	1	1						2				
Permitted Phases	1	2						2				
Actuated Green, G (s)	36.0	36.0					36.0	36.0				
Effective Green, g (s)	37.0	37.0					37.0	37.0				
Actuated g/C Ratio	0.46	0.46					0.46	0.46				
Clearance Time (s)	4.0	4.0					4.0	4.0				
Lane Grp Cap (vph)	1630	1630					803	1499				
v/s Ratio Prot								c0.25				
v/s Ratio Perm	0.39	0.39					0.10	0.10				
v/c Ratio	0.84	0.84					0.21	0.55				
Uniform Delay, d1	18.9	18.9					12.8	15.5				
Progression Factor	1.00	1.00					1.00	1.00				
Incremental Delay, d2	5.5	5.5					0.6	1.4				
Delay (s)	24.4	24.4					13.4	16.9				
Level of Service	C	C					B	B				
Approach Delay (s)	24.4	24.4					0.0	16.3			0.0	
Approach LOS	C	C					A	B			A	
Intersection Summary												
HCM Average Control Delay	21.0						HCM Level of Service					
HCM Volume to Capacity ratio	0.70						C					
Actuated Cycle Length (s)	80.0						Sum of lost time (s)					
Intersection Capacity Utilization	66.4%						6.0					
Analysis Period (min)	15						C					
Critical Lane Group												

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 The Transpo Group 1/17/06

HCM Signalized Intersection Capacity Analysis  
 6: Mercer St & 5th Ave

2025 With Alt 3 - PM Peak Hour

500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4TH											
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	11	12	12	12	12	11	11	11	11	12
Total Lost time (s)	3.0	3.0	3.0				3.0	3.0	3.0	3.0	3.0	
Lane Util. Factor	0.86	1.00	1.00				0.91	0.91	0.91	0.91	0.91	
Flpb, ped/bikes	1.00	0.92	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	1.00	
Flpb, ped/bikes	1.00	0.85	1.00	1.00	1.00	1.00	1.00	0.85	1.00	1.00	1.00	
Flt Protected	1.00	1.00	1.00				1.00	1.00	0.95	0.99		
Satd. Flow (prot)	5874	1421	1421				3190	1335	1527	2842		
Flt Permitted	1.00	1.00	1.00				1.00	1.00	0.12	0.66		
Satd. Flow (perm)	5874	1421	1421				3190	1335	201	1839		
Volume (vph)	65	1349	176	0	0	0	0	1099	459	126	163	0
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	69	1435	187	0	0	0	0	1169	488	134	173	0
RTOR Reduction (vph)	0	0	58	0	0	0	0	0	164	0	0	0
Lane Group Flow (vph)	0	1504	129	0	0	0	0	1169	324	67	240	0
Confl. Peds. (#/hr)	30	35	35	30	35	35	30	95	25	25	95	95
Heavy Vehicles (%)	1%	1%	1%	0%	0%	0%	1%	1%	1%	4%	4%	4%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	18	0	0	18	0
Parking (#/hr)	25	25	25								8	
Turn Type	Perm	2	Perm					8		Perm	pm+pt	
Protected Phases		2								8	7	4
Permitted Phases	2		2							8	4	
Actuated Green, G (s)	22.0	22.0	22.0					26.0	26.0	46.0	46.0	
Effective Green, g (s)	25.0	25.0	25.0					29.0	29.0	49.0	49.0	
Actuated g/C Ratio	0.31	0.31	0.31					0.36	0.36	0.61	0.61	
Clearance Time (s)	6.0	6.0	6.0					6.0	6.0	6.0	6.0	
Lane Grp Cap (vph)	1836	444	444					1156	484	405	1360	
v/s Ratio Prot								c0.37	0.04	c0.04	c0.04	
v/s Ratio Perm	0.26	0.09	0.09					0.24	0.07	0.07		
v/c Ratio	0.82	0.29	0.29					1.01	0.67	0.17	0.18	
Uniform Delay, d1	25.4	20.8	20.8					25.5	21.5	21.3	6.7	
Progression Factor	0.71	0.45	0.45					0.79	0.86	2.52	2.81	
Incremental Delay, d2	2.8	1.1	1.1					27.5	6.3	0.7	0.2	
Delay (s)	20.9	10.4	10.4					47.7	24.7	54.3	19.2	
Level of Service	C	B	B					D	C	D	B	
Approach Delay (s)	19.7					0.0		40.9			26.8	
Approach LOS	B					A		D			C	
Intersection Summary												
HCM Average Control Delay	29.9						HCM Level of Service					
HCM Volume to Capacity Ratio	0.72						C					
Actuated Cycle Length (s)	80.0						Sum of lost time (s)					
Intersection Capacity Utilization	80.2%						6.0					
Analysis Period (min)	15						D					
Critical Lane Group	C						Critical Lane Group					

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 The Transpo Group 1/17/06

HCM Signalized Intersection Capacity Analysis  
 7: Mercer St & Dexter Avenue  
 2025 With Alt 3 - PM Peak Hour  
 500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBR	NBT	NBR	SBT	NEL	NER	NER2
Lane Configurations	4TTL									
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	10	11	10	12	12	12	12
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.86	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	0.95
Flt	1.00	0.86	1.00	0.85	1.00	0.85	1.00	0.87	0.85	0.85
Flt Protected	0.99	1.00	1.00	1.00	0.95	1.00	0.99	1.00	0.99	1.00
Satd. Flow (prot)	5761	1479	3032	1405	1501	3217	1480	1381		
Flt Permitted	0.99	1.00	1.00	1.00	0.13	1.00	0.99	1.00		
Satd. Flow (perm)	5761	1479	3032	1405	201	3217	1480	1381		
Volume (vph)	355	1964	55	110	515	175	310	475	30	345
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	399	2207	62	124	579	197	348	534	34	388
RTOR Reduction (vph)	0	0	0	65	0	6	0	0	0	2
Lane Group Flow (vph)	0	2668	0	59	579	191	348	534	233	198
Heavy Vehicles (%)	1%	1%	1%	0%	0%	0%	1%	1%	0%	0%
Turn Type	Perm	1	custom	Perm	pm+pt	Perm	pm+pt	Prot	Prot	Prot
Protected Phases	1	1	4	1	4	3	7	2	2	2
Permitted Phases	1	64.0	26.0	26.0	44.0	44.0	14.0	14.0	14.0	14.0
Actuated Green, G (s)	67.0	67.0	29.0	29.0	47.0	47.0	17.0	17.0	17.0	17.0
Effective Green, g (s)	67.0	67.0	29.0	29.0	47.0	47.0	17.0	17.0	17.0	17.0
Actuated g/C Ratio	0.48	0.48	0.21	0.21	0.34	0.34	0.12	0.12	0.12	0.12
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lane Grp Cap (vph)	2757	708	626	291	207	1080	180	168		
v/s Ratio Prot	0.04	0.19	0.18	0.17	0.17	0.17	0.16	0.14		
v/s Ratio Perm	0.46	0.97	0.08	0.92	0.66	1.68	0.49	1.29	1.18	
v/c Ratio	0.37	0.08	0.92	0.66	1.68	0.49	1.29	1.18		
Uniform Delay, d1	35.4	19.8	54.4	50.9	39.2	37.0	61.5	61.5		
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		
Incremental Delay, d2	11.1	0.2	21.1	11.0	326.7	1.6	167.3	126.1		
Delay (s)	46.5	20.1	75.5	61.9	365.8	38.7	228.8	187.6		
Level of Service	D	C	E	E	F	D	F	F		
Approach Delay (s)	46.5	72.1		167.7	209.8					
Approach LOS	D	E		F	F	F	F	F		
Intersection Summary										
HCM Average Control Delay	86.3									
HCM Volume to Capacity ratio	1.26									
Actuated Cycle Length (s)	140.0									
Intersection Capacity Utilization	103.2%									
Analysis Period (min)	15									
c Critical Lane Group										

HCM Signalized Intersection Capacity Analysis  
 8: Mercer St & 9th Ave  
 2025 With Alt 3 - PM Peak Hour  
 500 Fifth Avenue North

Movement	EBT	EBR	SBT	SBR	SER
Lane Configurations	1TTL				
Ideal Flow (vphpl)	1900	1900	1900	1900	1900
Lane Width	11	12	12	9	12
Total Lost time (s)	3.0	3.0	3.0	3.0	11
Lane Util. Factor	0.86	0.91	0.91	0.91	
Fltb, ped/bikes	1.00	1.00	1.00	1.00	
Fltb, ped/bikes	1.00	0.88	0.94		
Flt Protected	1.00	1.00	0.98		
Flt Permitted	1.00	0.95	0.98		
Satd. Flow (prot)	5616	1288	2505		
Flt Permitted	1.00	0.95	0.98		
Satd. Flow (perm)	5616	1288	2505		
Volume (vph)	2459	40	705	315	90
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	2509	41	719	321	92
RTOR Reduction (vph)	2	0	1	1	0
Lane Group Flow (vph)	2548	0	367	763	0
Conf. Peds. (#/hr)			50		
Heavy Vehicles (%)	1%	1%	1%	1%	1%
Bus Blockages (#/hr)	0	0	0	2	0
Turn Type	Perm	1	2	2	custom
Protected Phases	1	1	2	2	2
Permitted Phases	1	1	2	2	2
Actuated Green, G (s)	70.0	72.5	41.5	41.5	41.5
Effective Green, g (s)	70.0	72.5	41.5	41.5	41.5
Actuated g/C Ratio	0.60	0.35	0.35	0.35	0.35
Clearance Time (s)	5.5	5.5	5.5	5.5	5.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	3393	6045	445	866	
v/s Ratio Prot	0.45		0.28	0.30	
v/s Ratio Perm	0.75	0.82	0.88		
Uniform Delay, d1	17.2	35.9	36.9		
Progression Factor	1.00	1.42	1.42		
Incremental Delay, d2	1.6	7.4	6.6		
Delay (s)	18.8	58.5	59.0		
Level of Service	B	E	E		
Approach Delay (s)	18.8	58.9			
Approach LOS	B	E			
Intersection Summary					
HCM Average Control Delay	31.1				
HCM Volume to Capacity ratio	0.80				
Actuated Cycle Length (s)	120.0				
Intersection Capacity Utilization	70.8%				
Analysis Period (min)	15				
i Phase conflict between lane groups					
c Critical Lane Group					



HCM Signalized Intersection Capacity Analysis  
9: Mercer St & Westlake Ave

2025 With Alt 3 - PM Peak Hour  
500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	GBR
Lane Configurations	4TTL						4TTL					
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	12	12	12	12	12	11	12	12	12	12
Total Lost time (s)	3.0						3.0	3.0	3.0	3.0	3.0	
Lane Util. Factor	0.86						0.91	0.91	1.00	1.00	1.00	
Frt	1.00						0.99	0.85	1.00	1.00	1.00	
Flt Protected	1.00						1.00	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	5601						2944	1310	1624	1710	1710	
Flt Permitted	1.00						1.00	1.00	0.95	1.00	1.00	
Satd. Flow (perm)	5601						2944	1310	1624	1710	1710	
Volume (vph)	285	2854	15	0	0	0	0	1215	705	310	125	0
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	288	2883	15	0	0	0	0	1227	712	313	126	0
RTOR Reduction (vph)	0	1	0	0	0	0	0	5	19	0	0	0
Lane Group Flow (vph)	0	3185	0	0	0	0	0	1326	589	313	126	0
Heavy Vehicles (%)	1%	1%	1%	0%	0%	0%	1%	1%	1%	0%	0%	0%
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4						6			5	2	
Permitted Phases	4						6			6		
Actuated Green, G (s)	46.5						38.5	38.5	18.5	62.5		
Effective Green, g (s)	49.0						41.0	41.0	21.0	65.0		
Actuated g/C Ratio	0.41						0.34	0.34	0.18	0.54		
Clearance Time (s)	5.5						5.5	5.5	5.5	5.5		
Vehicle Extension (s)	3.0						3.0	3.0	3.0	3.0		
Lane Grp Cap (vph)	2287						1006	448	284	926		
v/s Ratio Prot							c0.45		c0.19	0.07		
v/s Ratio Perm	0.57							0.45				
v/c Ratio	1.39						1.32	1.31	1.10	0.14		
Uniform Delay, d1	35.5						39.5	39.5	49.5	13.6		
Progression Factor	0.76						1.00	1.00	1.23	0.81		
Incremental Delay, d2	178.5						150.0	156.4	80.8	0.3		
Delay (s)	205.6						189.5	195.9	141.7	11.3		
Level of Service	F						F	F	F	B		
Approach Delay (s)	205.6						191.5			104.3		
Approach LOS	F						F			F		
Intersection Summary												
HCM Average Control Delay	192.7											
HCM Volume to Capacity ratio	1.31											
Actuated Cycle Length (s)	120.0									9.0		
Intersection Capacity Utilization	125.8%									H		
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis  
10: Mercer St & Fairview Ave

2025 With Alt 3 - PM Peak Hour  
500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	GBR
Lane Configurations	4TTL						4TTL					
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	12	12	12	12	12	10	12	12	12	12
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.91	1.00	1.00	0.97	0.88	1.00	0.88	1.00	0.85	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	0.85	1.00	0.85	1.00	0.85	1.00	1.00	1.00
Flt Protected	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	4512	1454	3120	2533	1586	2558	1613	1613	1613	1613	1613	1613
Flt Permitted	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00
Satd. Flow (perm)	4512	1454	3120	2533	1586	2558	1613	1613	1613	1613	1613	1613
Volume (vph)	5	3824	355	75	470	2177	340	1480	15	70		
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97		
Adj. Flow (vph)	5	3942	366	77	485	2244	351	1526	15	72		
RTOR Reduction (vph)	0	0	6	0	0	47	0	1	0	0		
Lane Group Flow (vph)	0	3947	437	0	485	2197	351	1540	0	72		
Heavy Vehicles (%)	0%	0%	0%	0%	1%	1%	0%	0%	0%	6%		
Turn Type	Split	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	11	1	1	2	12	1	2	3	2	3		
Permitted Phases	11			12			12					
Actuated Green, G (s)	69.5	69.5	69.5	12.5	87.5	17.5	35.5	17.5	35.5	17.5		
Effective Green, g (s)	72.0	72.0	72.0	15.0	90.0	24.0	42.0	24.0	42.0	24.0		
Actuated g/C Ratio	0.60	0.60	0.60	0.12	0.75	0.20	0.35	0.20	0.35	0.20		
Clearance Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5		
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		
Lane Grp Cap (vph)	2707	872	390	1900	319	895	323					
v/s Ratio Prot	c0.87	0.30		0.16	0.87	0.22	c0.60	0.04				
v/s Ratio Perm												
v/c Ratio	1.46	0.50		1.24	1.16	1.10	1.72	0.22				
Uniform Delay, d1	24.0	13.7		52.5	15.0	48.0	39.0	40.2				
Progression Factor	0.51	0.46		1.00	1.00	1.00	1.00	0.66				
Incremental Delay, d2	206.3	0.2		129.6	76.8	80.0	329.2	0.4				
Delay (s)	218.5	6.5		182.1	91.8	128.0	368.2	27.0				
Level of Service	F	A		F	F	F	F	C				
Approach Delay (s)	197.1			323.7				27.0				
Approach LOS	F			F				C				
Intersection Summary												
HCM Average Control Delay	195.3											
HCM Volume to Capacity ratio	1.55											
Actuated Cycle Length (s)	120.0							6.0				
Intersection Capacity Utilization	196.7%							H				
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis 2025 With Alt 3 - PM Peak Hour  
11: Republican St & 5th Ave 500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Frpb, ped/bikes	1.00	0.98	1.00	1.00	1.00	1.00	1.00	0.99	1.00	0.99	1.00	1.00
Flpb, ped/bikes	0.98	1.00	0.87	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt	1.00	0.85	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.95	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1624	1448	1485	1488	1484	1674	3317					
Flt Permitted	0.95	1.00	0.52	1.00	0.11	1.00						
Satd. Flow (perm)	1624	1448	810	4884	199	3317						
Volume (vph)	0	0	0	327	5	151	20	1417	47	14	340	10
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	0	0	0	352	5	162	22	1524	51	15	366	11
RTOR Reduction (vph)	0	0	0	0	0	12	0	4	0	0	2	0
Lane Group Flow (vph)	0	0	0	357	150	22	1571	0	15	375	0	0
Conf. Peds. (#/hr)	10	20	20	10	75	20	20	20	20	20	75	75
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	2%	2%	2%	4%	4%	4%
Parking (#/hr)	8											
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	6	6	6	8	8	8	8	8	8	8	8	8
Permitted Phases	6	6	6	8	8	8	8	8	8	8	8	8
Actuated Green, G (s)	23.6	23.6	45.4	45.4	45.4	45.4	45.4	45.4	45.4	45.4	45.4	45.4
Effective Green, g (s)	25.6	25.6	48.4	48.4	48.4	48.4	48.4	48.4	48.4	48.4	48.4	48.4
Actuated g/C Ratio	0.32	0.32	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
Clearance Time (s)	5.0	5.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	520	463	490	2955								
v/s Ratio Prot	0.22	0.10	0.03									
v/s Ratio Perm	0.89	0.32	0.04	0.53								
v/c Ratio	23.7	20.6	6.4	9.2								
Uniform Delay, d1	1.00	1.00	1.04	0.75								
Progression Factor	3.8	0.4	0.1	0.6								
Incremental Delay, d2	27.5	21.1	6.8	7.5								
Delay (s)	C	C	A	A								
Level of Service	0.0	0.0	25.5	7.5								
Approach Delay (s)	A	A	C	A								
Approach LOS	A	A	C	A								
Intersection Summary												
HCM Average Control Delay	10.8											
HCM Volume to Capacity ratio	0.59											
Actuated Cycle Length (s)	80.0											
Intersection Capacity Utilization	63.4%											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis 2025 With Alt 3 - PM Peak Hour  
12: Harrison St & 5th Ave 500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.67	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.94	1.00	1.00	1.00	1.00
Flt	1.00	0.85	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00	1.00	0.95	1.00	1.00	1.00	1.00
Satd. Flow (prot)	1517	903	1446	2841	1572	3334						
Flt Permitted	0.95	1.00	1.00	1.00	1.00	1.00	1.00	0.30	1.00	0.95		
Satd. Flow (perm)	1517	903	1446	2841	502	3334						
Volume (vph)	15	0	30	30	10	824	30	645	15	5	637	10
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	16	0	33	33	11	905	33	709	16	5	700	11
RTOR Reduction (vph)	0	31	0	0	0	0	0	2	0	0	1	0
Lane Group Flow (vph)	16	2	0	0	343	606	33	723	0	0	715	0
Conf. Peds. (#/hr)	19	19	100	100	185	115	115	185	115	115	185	185
Heavy Vehicles (%)	19%	19%	19%	19%	0%	0%	4%	4%	4%	4%	4%	4%
Turn Type	Split	Split	Split	Split	Split	Split	Split	Split	Split	Split	Split	Split
Protected Phases	2	2	2	2	6	6	6	6	8	8	8	8
Permitted Phases	2	2	2	2	6	6	6	6	8	8	8	8
Actuated Green, G (s)	4.4	4.4	25.5	25.5	36.1	36.1	36.1	36.1	36.1	36.1	36.1	36.1
Effective Green, g (s)	5.4	5.4	26.5	26.5	39.1	39.1	39.1	39.1	39.1	39.1	39.1	39.1
Actuated g/C Ratio	0.07	0.07	0.33	0.33	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49
Clearance Time (s)	4.0	4.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	102	61	479	941	245	1629						
v/s Ratio Prot	c0.01	0.00	c0.24	0.21	0.07							
v/s Ratio Perm	0.16	0.04	0.72	0.64	0.13	0.44						
v/c Ratio	35.2	34.9	23.5	22.7	11.2	13.4						
Uniform Delay, d1	1.00	1.00	1.00	1.00	1.56	1.65						
Progression Factor	0.7	0.2	5.1	1.5	0.4	0.3						
Incremental Delay, d2	35.9	35.1	28.5	24.3	17.9	22.4						
Delay (s)	D	D	C	C	B	C						
Level of Service	D	D	C	C	B	C						
Approach Delay (s)	35.4		25.8		22.2							
Approach LOS	D	D	C	C	B							
Intersection Summary												
HCM Average Control Delay	22.7											
HCM Volume to Capacity ratio	0.53											
Actuated Cycle Length (s)	80.0											
Intersection Capacity Utilization	64.6%											
Analysis Period (min)	15											
c Critical Lane Group												



HCM Unsignalized Intersection Capacity Analysis  
13: Harrison St & Broad St  
2025 With Alt 3 - PM Peak Hour  
500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NER	NWL	SWL	SWT	SWR
Lane Configurations												
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Volume (veh/h)	0	0	5	0	0	65	0	755	15	0	1090	791
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	0	0	5	0	0	67	0	778	15	0	1124	815
Pedestrians	20											
Lane Width (ft)	11.0											
Walking Speed (ft/s)	4.0											
Percent Blockage	2											
Right turn flare (veh)												
Median type	None			None								
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	2008	2345	990	1348	2745	397	1959					794
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	2008	2345	990	1348	2745	397	1959					794
IC, single (s)	7.5	6.5	6.9	7.6	6.6	7.0	4.1					4.1
IC, 2 stage (s)												
IF (s)	3.5	4.0	3.3	3.6	4.0	3.4	2.2					2.2
p0 queue free %	100	100	98	100	100	89	100					100
cM capacity (veh/h)	31	36	245	103	18	594	293					830
Direction, Lane #												
Volume Total	5	67	519	275	749	1190						
Volume Left	0	0	0	0	0	0						
Volume Right	5	67	0	15	0	815						
cSH	245	594	1700	1700	1700	1700						
Volume to Capacity	0.02	0.11	0.31	0.16	0.44	0.70						
Queue Length 95th (ft)	2	9	0	0	0	0						
Control Delay (s)	20.0	11.8	0.0	0.0	0.0	0.0						
Lane LOS	C	B										
Approach Delay (s)	20.0	11.8	0.0	0.0								
Approach LOS	C	B										
Intersection Summary												
Average Delay	0.3											
Intersection Capacity Utilization	66.3%						ICU Level of Service			C		
Analysis Period (min)	15											

HCM Signalized Intersection Capacity Analysis  
14: 5th Ave & Broad St  
2025 With Alt 3 - PM Peak Hour  
500 Fifth Avenue North

Movement	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NER	NWL	SWL	SWR
Lane Configurations	↕	↕	↕	↕	↕	↕	↕	↕	↕	↕	↕
Ideal Flow (vphpt)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	12	12	11	11	11	11	12	11	12
Total Lost time (s)		3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Util. Factor		0.95		0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95
Frbp, ped/bikes		0.99		1.00	0.85	1.00	1.00	1.00	1.00	0.99	
Fipb, ped/bikes		1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Fit		0.98		1.00	0.85	1.00	1.00	1.00	0.95	1.00	
Fit Protected		1.00		1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		3222		3331	1318	1694	3388	1646	3260		
Fit Permitted		0.95		1.00	1.00	0.95	1.00	0.95	1.00		
Satd. Flow (perm)		3057		3331	1318	1694	3388	1646	3260		
Volume (vph)	5	457	55	0	537	145	203	605	0	135	715
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Ajt. Flow (vph)	5	491	59	0	577	156	218	651	0	145	769
RTOR Reduction (vph)	0	11	0	0	0	0	0	0	0	0	3
Lane Group Flow (vph)	0	544	0	0	577	156	218	651	0	145	788
Confl. Peds. (#/hr)	115		85	85		115	130		45	45	130
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	3%	3%	3%	6%	6%
Bus Blockages (#/hr)	0	20	0	0	18	0	0	0	0	0	0
Turn Type				Perm	Prot					Prot	
Protected Phases		8		4		5	2		1		6
Permitted Phases				4							
Actuated Green, G (s)	21.0			21.0	21.0	14.0	24.0		14.0	24.0	
Effective Green, g (s)	27.0			27.0	27.0	17.0	27.0		17.0	27.0	
Actuated g/C Ratio	0.34			0.34	0.34	0.21	0.34		0.21	0.34	
Clearance Time (s)	9.0			9.0	9.0	6.0	6.0		6.0	6.0	
Lane Grp Cap (vph)	1032			1124	445	360	1143		350	1100	
v/s Ratio Prot				0.17		c0.13	0.19		0.09	c0.24	
v/s Ratio Perm	c0.18				0.12						
v/c Ratio	3.47dr			0.51	0.35	0.61	0.57		0.41	0.72	
Uniform Delay,d1	21.4			21.2	19.9	28.5	21.7		27.2	23.2	
Progression Factor	0.95			0.40	0.31	1.23	0.82		1.00	1.00	
Incremental Delay,d2	1.9			1.5	2.0	6.7	1.9		3.6	4.0	
Delay (s)	22.1			10.0	8.2	41.7	19.7		30.8	27.2	
Level of Service	C			A	A	D	B		C	C	
Approach Delay (s)	22.1			9.6			25.2		27.7		
Approach LOS	C			A			C		C		
Intersection Summary											
HCM Average Control Delay		21.7		HCM Level of Service				C			
HCM Volume to Capacity ratio		0.62									
Actuated Cycle Length (s)		80.0		Sum of lost time (s)				9.0			
Intersection Capacity Utilization		63.9%		ICU Level of Service				B			
Analysis Period (min)		15									
dr Detactor Right Lane Recode with 1 though lane as a right lane.											
c Critical Lane Group											

HCM Signalized Intersection Capacity Analysis  
 15: Denny Way & 1st Avenue  
 2025 With Alt 3 - PM Peak Hour  
 500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SBL	SBR	NWL	NWR
Lane Configurations	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	0.91	0.97	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Flt Protected	0.97	0.97	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3356	4878	4878	1719	1461	1719	1461	1719	1461	1719
Flt Permitted	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3176	4878	4878	1719	1461	1719	1461	1719	1461	1719
Volume (vph)	5	1324	375	0	1520	400	0	0	300	15
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	5	1409	399	0	1617	426	0	0	415	16
RTOR Reduction (vph)	0	26	0	0	48	0	0	0	0	0
Lane Group Flow (vph)	0	1787	0	0	1995	0	0	0	415	16
Heavy Vehicles (%)	4%	4%	4%	3%	3%	3%	0%	0%	5%	5%
Turn Type	1	1	1	1	1	1	1	1	1	1
Protected Phases	1	1	1	1	1	1	1	1	1	1
Permitted Phases	1	1	1	1	1	1	1	1	1	1
Actuated Green, G (s)	57.0	57.0	57.0	57.0	57.0	57.0	57.0	57.0	57.0	57.0
Effective Green, g (s)	59.0	59.0	59.0	59.0	59.0	59.0	59.0	59.0	59.0	59.0
Actuated g/C Ratio	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lane Grp Cap (vph)	1874	2878	602	511	2878	602	511	2878	602	511
v/s Ratio Prot	0.41	0.41	0.41	0.41	0.41	0.41	0.41	0.41	0.41	0.41
v/s Ratio Perm	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56
v/c Ratio	6.33dr	6.33dr	6.33dr	6.33dr	6.33dr	6.33dr	6.33dr	6.33dr	6.33dr	6.33dr
Uniform Delay, d1	19.2	14.2	14.2	14.2	14.2	14.2	14.2	14.2	14.2	14.2
Progression Factor	1.00	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42
Incremental Delay, d2	12.4	31.6	6.7	6.7	34.2	21.5	6.7	6.7	34.2	21.5
Delay (s)	31.6	31.6	6.7	6.7	34.2	21.5	6.7	6.7	34.2	21.5
Level of Service	C	C	A	A	C	C	A	A	C	C
Approach Delay (s)	31.6	31.6	6.7	6.7	34.2	21.5	6.7	6.7	34.2	21.5
Approach LOS	C	C	A	A	C	C	A	A	C	C
Intersection Summary										
HCM Average Control Delay	19.9	19.9	19.9	19.9	19.9	19.9	19.9	19.9	19.9	19.9
HCM Volume to Capacity ratio	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Actuated Cycle Length (s)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Intersection Capacity Utilization	80.7%	80.7%	80.7%	80.7%	80.7%	80.7%	80.7%	80.7%	80.7%	80.7%
Analysis Period (min)	15	15	15	15	15	15	15	15	15	15
dr: Default Right Lane: Recode with 1 though lane as a right lane.										
c Critical Lane Group										

HCM Signalized Intersection Capacity Analysis  
 16: Denny Way & Broad St  
 2025 With Alt 3 - PM Peak Hour  
 500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NER	SWL	SWR
Lane Configurations	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Flt Protected	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Satd. Flow (prot)	3356	4878	4878	1719	1461	1719	1461	1719	1461	1719
Flt Permitted	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3176	4878	4878	1719	1461	1719	1461	1719	1461	1719
Volume (vph)	15	855	0	0	1575	10	0	563	85	5
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	16	910	0	0	1676	11	0	599	69	5
RTOR Reduction (vph)	0	0	0	0	0	0	0	9	0	0
Lane Group Flow (vph)	0	926	0	0	1687	0	0	659	0	0
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Bus Blockages (#/hr)	0	3	0	0	23	0	0	0	0	0
Turn Type	1	1	1	1	1	1	1	1	1	1
Protected Phases	1	1	1	1	1	1	1	1	1	1
Permitted Phases	1	1	1	1	1	1	1	1	1	1
Actuated Green, G (s)	58.0	58.0	58.0	58.0	58.0	58.0	58.0	58.0	58.0	58.0
Effective Green, g (s)	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0
Actuated g/C Ratio	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lane Grp Cap (vph)	1778	1778	1778	1778	1778	1778	1778	1778	1778	1778
v/s Ratio Prot	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31
v/s Ratio Perm	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52
v/c Ratio	11.6	11.6	11.6	11.6	11.6	11.6	11.6	11.6	11.6	11.6
Uniform Delay, d1	16.4	16.4	16.4	16.4	16.4	16.4	16.4	16.4	16.4	16.4
Progression Factor	1.93	1.93	1.93	1.93	1.93	1.93	1.93	1.93	1.93	1.93
Incremental Delay, d2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Delay (s)	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5
Level of Service	C	C	C	C	C	C	C	C	C	C
Approach Delay (s)	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5
Approach LOS	C	C	C	C	C	C	C	C	C	C
Intersection Summary										
HCM Average Control Delay	23.3	23.3	23.3	23.3	23.3	23.3	23.3	23.3	23.3	23.3
HCM Volume to Capacity ratio	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Actuated Cycle Length (s)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Intersection Capacity Utilization	74.3%	74.3%	74.3%	74.3%	74.3%	74.3%	74.3%	74.3%	74.3%	74.3%
Analysis Period (min)	15	15	15	15	15	15	15	15	15	15
c Critical Lane Group										

HCM Signalized Intersection Capacity Analysis  
 17: Denny Way & 5th Ave

2025 With Alt 3 - PM Peak Hour  
 500 Fifth Avenue North

Movement	EBT	EBR	EBR2	WBT	WBR	NBL	NBT	NBR	NBR2	SBL2	SBL	SBL	SBL
Lane Configurations	1	1	1	1	1	1	1	1	1	1	1	1	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	10	12	12	10	12	12	11	12	13	13
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Flpb, ped/bikes	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Flt Protected	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	3271	3271	3271	3271	3271	3271	3271	3271	3271	3271	3271	3271	3271
Flt Permitted	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (perm)	3271	3271	3271	3271	3271	3271	3271	3271	3271	3271	3271	3271	3271
Volume (vph)	820	195	15	910	182	5	160	40	10	115	234	115	115
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	872	207	16	968	194	5	170	43	11	122	249	122	122
RTOR Reduction (vph)	1	0	0	16	0	0	3	0	0	0	0	0	0
Lane Group Flow (vph)	1094	0	0	1146	0	0	226	0	0	0	371	130	130
Conf. Peds. (#/hr)	8	8	8	8	8	8	8	8	8	8	8	8	8
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	6%	6%	6%	6%	3%	3%	3%
Bus Blockages (#/hr)	3	0	0	4	0	0	18	0	0	0	0	0	0
Turn Type	Protected Phases	1	1	1	1	1	3	3	3	2	2	2	2
Permitted Phases	Permitted Phases	1	1	1	1	1	3	3	3	2	2	2	2
Actuated Green, G (s)	49.4	49.4	49.4	49.4	49.4	49.4	12.4	12.4	12.4	23.2	23.2	23.2	23.2
Effective Green, g (s)	51.4	51.4	51.4	51.4	51.4	51.4	14.4	14.4	14.4	25.2	25.2	25.2	25.2
Actuated g/C Ratio	0.51	0.51	0.51	0.51	0.51	0.51	0.14	0.14	0.14	0.25	0.25	0.25	0.25
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1681	1646	1646	1646	1646	1646	425	425	425	442	473	473	473
v/s Ratio Prot	0.33	0.33	0.33	0.33	0.33	0.33	0.08	0.08	0.08	0.21	0.07	0.07	0.07
v/s Ratio Perm	0.65	0.65	0.65	0.65	0.65	0.65	0.53	0.53	0.53	0.84	0.27	0.27	0.27
Uniform Delay, d1	17.7	17.7	17.7	17.7	17.7	17.7	39.7	39.7	39.7	35.5	30.1	30.1	30.1
Progression Factor	0.35	0.35	0.35	0.35	0.35	0.35	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.6	1.6	1.6	1.6	1.6	1.6	1.3	1.3	1.3	13.1	0.3	0.3	0.3
Delay (s)	7.8	7.8	7.8	7.8	7.8	7.8	40.9	40.9	40.9	48.6	30.4	30.4	30.4
Level of Service	A	A	A	A	A	A	D	D	D	D	D	D	D
Approach Delay (s)	7.8	7.8	7.8	7.8	7.8	7.8	40.9	40.9	40.9	48.6	30.4	30.4	30.4
Approach LOS	A	A	A	A	A	A	D	D	D	D	D	D	D
Intersection Summary													
HCM Average Control Delay	19.5												
HCM Volume to Capacity ratio	0.71												
Actuated Cycle Length (s)	100.0												
Intersection Capacity Utilization	66.8%												
Analysis Period (min)	15												
Critical Lane Group													

HCM Signalized Intersection Capacity Analysis  
 17: Denny Way & 5th Ave

2025 With Alt 3 - PM Peak Hour  
 500 Fifth Avenue North

Movement	SBR
Lane Configurations	1
Ideal Flow (vphpl)	1900
Lane Width	12
Total Lost time (s)	
Lane Util. Factor	
Flpb, ped/bikes	
Flpb, ped/bikes	
Flt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Volume (vph)	10
Peak-hour factor, PHF	0.94
Adj. Flow (vph)	11
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Conf. Peds. (#/hr)	17
Heavy Vehicles (%)	3%
Bus Blockages (#/hr)	0
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	
Intersection Summary	

HCM Signalized Intersection Capacity Analysis  
 18: Denny Way & Aurora Ave

2025 With Alt 3 - PM Peak Hour  
 500 Fifth Avenue North

Movement	EBT	EBR	EBR2	WBT	WBR	NBT	NBR	NBR2	SBL2	SBL	SBT	SBR
Lane Configurations	11	12	11	12	12	12	12	12	12	12	12	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	11	12	12	12	12	12	12	12	12	12
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Fit	0.99	0.99	0.97	0.98	1.00	0.98	1.00	0.95	0.85	0.85	1.00	1.00
Fit Protected	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	1.00	1.00
Satd. Flow (prot)	3085	3017	3017	3154	3154	3154	3154	1993	1332	1354	1993	1332
Fit Permitted	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Satd. Flow (perm)	3085	3017	3017	3154	3154	3154	3154	1593	1332	1354	1593	1332
Volume (vph)	1229	65	5	1273	315	1125	165	5	245	80	0	490
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	1254	66	5	1299	321	1148	168	5	250	82	0	500
RTOR Reduction (vph)	0	0	0	22	0	0	0	0	0	0	0	2
Lane Group Flow (vph)	1325	0	0	1598	0	1321	0	0	0	332	260	258
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	4	0
Turn Type	2	2	2	4	4	4	4	4	3	3	8	8
Protected Phases	2	2	2	4	4	4	4	4	3	3	8	8
Permitted Phases	2	2	2	4	4	4	4	4	3	3	8	8
Actuated Green, G (s)	26.0	26.0	26.0	30.1	30.1	30.1	30.1	30.1	24.9	24.9	60.0	60.0
Effective Green, g (s)	32.0	32.0	32.0	32.1	32.1	32.1	32.1	32.1	26.9	26.9	62.0	62.0
Actuated g/C Ratio	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.27	0.27	0.62	0.62
Clearance Time (s)	9.0	9.0	9.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	987	965	965	1012	1012	1012	1012	429	826	899	429	826
v/s Ratio Prot	0.43	c0.53	c0.53	c0.42	c0.42	c0.42	c0.42	c0.21	0.20	0.19	c0.21	0.20
v/s Ratio Perm	1.34	1.66	1.66	1.31	1.31	1.31	1.31	0.77	0.31	0.31	0.77	0.31
Uniform Delay, d1	34.0	34.0	34.0	34.0	34.0	34.0	34.0	33.7	9.0	8.9	33.7	9.0
Progression Factor	0.99	0.99	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	160.6	298.0	298.0	144.6	144.6	144.6	144.6	8.5	0.2	0.2	8.5	0.2
Delay (s)	194.3	317.0	317.0	178.6	178.6	178.6	178.6	42.2	9.2	9.1	42.2	9.2
Level of Service	F	F	F	F	F	F	F	D	A	A	D	A
Approach Delay (s)	194.3	317.0	317.0	178.6	178.6	178.6	178.6	22.0			22.0	
Approach LOS	F	F	F	F	F	F	F	C			C	
Intersection Summary												
HCM Average Control Delay	200.4											
HCM Volume to Capacity ratio	1.27											
Actuated Cycle Length (s)	100.0											
Intersection Capacity Utilization	120.8%											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis  
 18: Denny Way & Aurora Ave

2025 With Alt 3 - PM Peak Hour  
 500 Fifth Avenue North

Movement	SBR2
Lane Configurations	1900
Ideal Flow (vphpl)	12
Lane Width	12
Total Lost time (s)	
Lane Util. Factor	
Fit	
Fit Protected	
Satd. Flow (prot)	
Fit Permitted	
Satd. Flow (perm)	
Volume (vph)	20
Peak-hour factor, PHF	0.98
Adj. Flow (vph)	20
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Heavy Vehicles (%)	2%
Bus Blockages (#/hr)	0
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	
Intersection Summary	

HCM Signalized Intersection Capacity Analysis  
19: Denny Way & Dexter Avenue

2025 With Alt 3 - PM Peak Hour  
500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4T	4T	4T	4T	4T	4T	4T	4T	4T	4T	4T	4T
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Fit	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fit Protected	3198	3210	3210	3210	3210	3210	3210	3210	3210	3210	3210	3210
Satd. Flow (prot)	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52
Fit Permitted	1677	1677	1677	1677	1677	1677	1677	1677	1677	1677	1677	1677
Satd. Flow (perm)	155	1384	10	0	1288	110	10	215	20	115	280	285
Volume (vph)	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Peak-hour factor, PHF	165	1472	11	0	1349	117	11	229	21	122	298	282
Adj. Flow (vph)	0	0	0	0	5	0	0	9	0	0	0	219
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	1648	0	0	1461	0	11	241	0	122	298	63
Heavy Vehicles (%)	1%	1%	1%	0%	0%	0%	11%	11%	11%	2%	2%	2%
Turn Type	pm-pt	pm-pt	pm-pt	pm-pt	pm-pt	pm-pt	pm-pt	pm-pt	pm-pt	pm-pt	pm-pt	pm-pt
Protected Phases	2	5	1	1	1	1	1	1	1	1	1	1
Permitted Phases	5	5	3	3	3	3	3	3	3	3	3	3
Actuated Green, G (s)	68.7	50.7	19.3	19.3	19.3	19.3	19.3	19.3	19.3	19.3	19.3	19.3
Effective Green, g (s)	71.7	53.7	22.3	22.3	22.3	22.3	22.3	22.3	22.3	22.3	22.3	22.3
Actuated g/C Ratio	0.72	0.54	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1431	1724	157	644	192	710	318	0.09	0.09	0.09	0.09	0.09
v/s Ratio Prot	c0.17	0.46	0.02	0.08	0.02	0.08	0.02	0.08	0.02	0.08	0.02	0.08
v/s Ratio Perm	c0.65	0.85	0.07	0.37	0.07	0.37	0.07	0.37	0.07	0.37	0.07	0.37
v/c Ratio	1.15	19.7	30.7	32.9	35.2	33.3	31.6	1.00	1.00	1.00	1.00	1.00
Uniform Delay, d1	14.1	0.90	0.65	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Progression Factor	69.0	5.1	0.2	0.4	0.2	0.4	0.2	0.4	0.2	0.4	0.2	0.4
Incremental Delay, d2	81.8	17.8	30.9	33.3	41.9	33.7	31.9	0.09	0.09	0.09	0.09	0.09
Delay (s)	F	F	B	C	C	C	C	C	C	C	C	C
Level of Service	F	F	B	C	C	C	C	C	C	C	C	C
Approach Delay (s)	81.8	17.8	33.2	33.2	33.2	33.2	33.2	33.2	33.2	33.2	33.2	33.2
Approach LOS	F	F	B	C	C	C	C	C	C	C	C	C
Intersection Summary												
HCM Average Control Delay	47.5											
HCM Volume to Capacity ratio	1.01											
Actuated Cycle Length (s)	100.0											
Intersection Capacity Utilization	118.4%											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis  
20: Denny Way & Westlake Ave

2025 With Alt 3 - PM Peak Hour  
500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4T	4T	4T	4T	4T	4T	4T	4T	4T	4T	4T	4T
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Fit	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fit Protected	3087	3087	3087	3087	3087	3087	3087	3087	3087	3087	3087	3087
Satd. Flow (prot)	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52
Fit Permitted	1677	1677	1677	1677	1677	1677	1677	1677	1677	1677	1677	1677
Satd. Flow (perm)	155	1384	10	0	1288	110	10	215	20	115	280	285
Volume (vph)	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Peak-hour factor, PHF	165	1472	11	0	1349	117	11	229	21	122	298	282
Adj. Flow (vph)	0	0	0	0	5	0	0	9	0	0	0	219
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	1648	0	0	1461	0	11	241	0	122	298	63
Heavy Vehicles (%)	1%	1%	1%	0%	0%	0%	11%	11%	11%	2%	2%	2%
Turn Type	pm-pt	pm-pt	pm-pt	pm-pt	pm-pt	pm-pt	pm-pt	pm-pt	pm-pt	pm-pt	pm-pt	pm-pt
Protected Phases	2	5	1	1	1	1	1	1	1	1	1	1
Permitted Phases	5	5	3	3	3	3	3	3	3	3	3	3
Actuated Green, G (s)	68.7	50.7	19.3	19.3	19.3	19.3	19.3	19.3	19.3	19.3	19.3	19.3
Effective Green, g (s)	71.7	53.7	22.3	22.3	22.3	22.3	22.3	22.3	22.3	22.3	22.3	22.3
Actuated g/C Ratio	0.72	0.54	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1431	1724	157	644	192	710	318	0.09	0.09	0.09	0.09	0.09
v/s Ratio Prot	c0.17	0.46	0.02	0.08	0.02	0.08	0.02	0.08	0.02	0.08	0.02	0.08
v/s Ratio Perm	c0.65	0.85	0.07	0.37	0.07	0.37	0.07	0.37	0.07	0.37	0.07	0.37
v/c Ratio	1.15	19.7	30.7	32.9	35.2	33.3	31.6	1.00	1.00	1.00	1.00	1.00
Uniform Delay, d1	14.1	0.90	0.65	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Progression Factor	69.0	5.1	0.2	0.4	0.2	0.4	0.2	0.4	0.2	0.4	0.2	0.4
Incremental Delay, d2	81.8	17.8	30.9	33.3	41.9	33.7	31.9	0.09	0.09	0.09	0.09	0.09
Delay (s)	F	F	B	C	C	C	C	C	C	C	C	C
Level of Service	F	F	B	C	C	C	C	C	C	C	C	C
Approach Delay (s)	81.8	17.8	33.2	33.2	33.2	33.2	33.2	33.2	33.2	33.2	33.2	33.2
Approach LOS	F	F	B	C	C	C	C	C	C	C	C	C
Intersection Summary												
HCM Average Control Delay	47.5											
HCM Volume to Capacity ratio	1.01											
Actuated Cycle Length (s)	100.0											
Intersection Capacity Utilization	118.4%											
Analysis Period (min)	15											
c Critical Lane Group												



HCM Signalized Intersection Capacity Analysis 2025 With Alt 3 - PM Peak Hour  
21: Denny Way & Fairview Ave 500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1	1	1	1	1	1	1	1	1	1	1	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	12	11	11	12	9	10	12	10	10	12
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.97	0.95	1.00	0.95	1.00	0.95
Fit Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1555	3108	1555	3052	1555	3052	2808	2873	1501	2852	1501	2852
Fit Permitted	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	1555	3108	1555	3052	1555	3052	2808	2873	1501	2852	1501	2852
Volume (vph)	235	1215	5	50	818	115	460	545	220	265	340	170
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	245	1266	5	52	852	120	479	568	229	276	354	177
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	245	1271	0	52	961	0	479	751	0	276	466	0
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	1	6	5	2	3	8	7	4				
Permitted Phases												
Actuated Green, G (s)	13.5	34.7	6.8	28.0	18.5	29.5	9.0	20.0				
Effective Green, g (s)	15.5	36.7	8.8	30.0	20.5	31.5	11.0	22.0				
Actuated g/C Ratio	0.16	0.37	0.09	0.30	0.20	0.32	0.11	0.22				
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0				
Lane Grp Cap (vph)	241	1141	137	916	576	905	165	627				
vis Ratio Prot	c0.46	c0.41	0.03	0.31	c0.17	c0.26	c0.18	0.16				
vis Ratio Perm												
v/c Ratio	1.02	1.11	0.38	1.05	0.83	0.83	1.67	0.74				
Uniform Delay, d1	42.2	31.6	43.0	35.0	38.1	31.8	44.5	36.4				
Progression Factor	1.00	1.00	0.89	1.22	1.00	1.00	1.07	0.86				
Incremental Delay, d2	62.3	63.7	1.4	40.3	9.9	6.4	326.8	4.6				
Delay (s)	104.6	95.3	39.6	83.0	48.0	38.1	374.7	35.8				
Level of Service	F	F	D	F	D	D	F	D				
Approach Delay (s)	96.8		80.8		41.9		151.7					
Approach LOS	F		F		D		F					
Intersection Summary												
HCM Average Control Delay	87.7											
HCM Volume to Capacity ratio	1.04											
Actuated Cycle Length (s)	100.0											
Intersection Capacity Utilization	97.9%											
Analysis Period (min)	15											
c Critical Lane Group												

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The Transpo Group 1/17/06

HCM Signalized Intersection Capacity Analysis 2025 With Alt 3 - PM Peak Hour  
22: Denny Way & Stewart St 500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1	1	1	1	1	1	1	1	1	1	1	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	12	11	11	12	9	10	12	10	10	12
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	1.00	0.95	1.00	1.00	1.00	0.96	0.95	1.00	0.95	1.00	0.95
Fit Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	2970	2970	1593	1676	2970	2970	1593	1676	2970	2970	1593	1676
Fit Permitted	1.00	1.00	0.95	1.00	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	2970	2970	1593	1676	2970	2970	1593	1676	2970	2970	1593	1676
Volume (vph)	0	845	885	345	913	0	0	0	0	0	145	1095
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	0	862	903	352	932	0	0	0	0	0	148	1117
RTOR Reduction (vph)	0	40	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	1725	0	352	932	0	0	0	0	0	1338	0
Heavy Vehicles (%)	1%	1%	1%	2%	2%	2%	0%	0%	0%	0%	11%	11%
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	3	2	2	2	3	1						
Permitted Phases												
Actuated Green, G (s)	43.5	21.5	69.5									
Effective Green, g (s)	45.0	23.0	71.0									
Actuated g/C Ratio	0.45	0.23	0.71									
Clearance Time (s)	4.5	4.5	4.5									
Vehicle Extension (s)	3.0	3.0	3.0									
Lane Grp Cap (vph)	1337	366	1190									
vis Ratio Prot	c0.58	c0.22	0.56									
vis Ratio Perm												
v/c Ratio	1.29	0.96	0.78									
Uniform Delay, d1	27.5	38.1	9.5									
Progression Factor	0.87	1.00	1.00									
Incremental Delay, d2	135.9	38.3	3.4									
Delay (s)	159.8	76.4	12.9									
Level of Service	F	E	B									
Approach Delay (s)	159.8		30.3									
Approach LOS	F	C	A									
Intersection Summary												
HCM Average Control Delay	104.3											
HCM Volume to Capacity ratio	1.16											
Actuated Cycle Length (s)	100.0											
Intersection Capacity Utilization	110.4%											
Analysis Period (min)	15											
c Critical Lane Group												

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The Transpo Group 1/17/06

HCM Signalized Intersection Capacity Analysis  
 23: Yale St & Stewart St

2025 With Alt 3 - PM Peak Hour  
 500 Fifth Avenue North

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations	↑	↑	↑	↑	↑							
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0				3.0	3.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00				1.00	0.91	
Frt	1.00	0.85	1.00	1.00	1.00					1.00	1.00	
Flt Protected	1.00	1.00	0.95	1.00	1.00					0.95	1.00	
Satd. Flow (prot)	1693	1439	1593	1676						1477	4241	
Flt Permitted	1.00	1.00	0.09	1.00						0.95	1.00	
Satd. Flow (perm)	1693	1439	149	1676						1477	4241	
Volume (vph)	0	765	115	65	5	0	0	0	0	430	1010	5
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	0	814	122	69	5	0	0	0	0	457	1074	5
RTOR Reduction (vph)	0	0	32	0	0	0	0	0	0	0	0	1
Lane Group Flow (vph)	0	814	90	69	5	0	0	0	0	457	1078	0
Heavy Vehicles (%)	1%	1%	1%	2%	2%	2%	0%	0%	0%	10%	10%	10%
Turn Type		Perm	Perm							Perm		
Protected Phases	3			3		3					1 2	
Permitted Phases		3	3		3						1 2	1 2
Actuated Green, G (s)		43.5	43.5	43.5	43.5					47.5	47.5	
Effective Green, g (s)		45.0	45.0	45.0	45.0					49.0	49.0	
Actuated g/C Ratio		0.45	0.45	0.45	0.45					0.49	0.49	
Clearance Time (s)		4.5	4.5	4.5	4.5							
Vehicle Extension (s)		3.0	3.0	3.0	3.0							
Lane Grp Cap (vph)		762	648	67	754					724	2078	
v/s Ratio Prot		c0.48			0.00						0.25	
v/s Ratio Perm			0.06	0.46						c0.31		
v/c Ratio		1.07	0.14	1.03	0.01					0.63	0.52	
Uniform Delay, d1		27.5	16.1	27.5	15.2					18.8	17.4	
Progression Factor		0.77	0.33	1.06	1.19					0.75	0.70	
Incremental Delay, d2		46.7	0.1	88.2	0.0					0.4	0.1	
Delay (s)		67.8	5.4	117.3	18.0					14.5	12.3	
Level of Service		E	A	F	B					B	B	
Approach Delay (s)		59.7						0.0			12.9	
Approach LOS		E			F			A			B	
Intersection Summary												
HCM Average Control Delay		33.0						HCM Level of Service		C		
HCM Volume to Capacity ratio		0.84										
Actuated Cycle Length (s)		100.0						Sum of lost time (s)		6.0		
Intersection Capacity Utilization		85.2%						ICU Level of Service		E		
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis  
 24: Yale St & Howell St

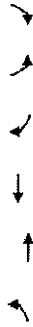
2025 With Alt 3 - PM Peak Hour  
 500 Fifth Avenue North

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Total Lost time (s)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	1593	1339	1339	1339	1339	1339	1339	1339	1339	1339	1339	1339
Flt Permitted	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (perm)	1593	1339	1339	1339	1339	1339	1339	1339	1339	1339	1339	1339
Volume (vph)	55	1125	10	0	0	0	0	0	0	920	860	0
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	57	1172	10	0	0	0	0	0	0	958	896	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	44	0	1
Lane Group Flow (vph)	57	1182	0	0	0	0	0	0	0	1020	852	0
Heavy Vehicles (%)	2%	2%	2%	0%	0%	0%	0%	0%	0%	4%	4%	2%
Parking (#/hr)	20											
Turn Type	Split	Perm Prot										
Protected Phases	2	2	1									
Permitted Phases												
Actuated Green, G (s)	55.0	55.0	35.0 35.0									
Effective Green, g (s)	57.0	57.0	37.0 37.0									
Actuated g/C Ratio	0.57	0.57	0.37 0.37									
Clearance Time (s)	5.0	5.0	5.0 5.0									
Vehicle Extension (s)	3.0	3.0	3.0 3.0									
Lane Grp Cap (vph)	908	763	1060 517									
v/s Ratio Prot	0.04	c0.88	c0.61									
v/s Ratio Perm												
v/c Ratio	0.06	1.55	0.36									
Uniform Delay, d1	9.6	21.5	0.96 1.65									
Progression Factor	1.46	1.56	30.8 31.5									
Incremental Delay, d2	0.0	249.5	1.00 1.00									
Delay (s)	14.0	283.1	19.9 300.1									
Level of Service	B	F	D F									
Approach Delay (s)	270.7	F	182.1 F									
Approach LOS	F	A	F C									
Intersection Summary												
HCM Average Control Delay	204.7	HCM Level of Service										
HCM Volume to Capacity ratio	1.59	F										
Actuated Cycle Length (s)	100.0	Sum of lost time (s)										
Intersection Capacity Utilization	132.3%	ICU Level of Service										
Analysis Period (min)	15	H										
c Critical Lane Group												



HCM Unsignalized Intersection Capacity Analysis  
25: Harrison St & Site Access

2025 With Alt 3 - PM Peak Hour  
500 Fifth Avenue North



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↑ ↑ ↑ ↑ ↑ ↑					
Sign Control	Free Free Stop					
Grade	0% 0% 0%					
Volume (veh/h)	0	20	824	37	0	40
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	22	896	40	0	43
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage (veh)						
Upstream signal (ft)	173					
pX, platoon unblocked						
vC, conflicting volume	936					938 319
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	936					938 319
IC, single (s)	4.1					6.8 6.9
IC, 2 stage (s)						
tF (s)	2.2					3.5 3.3
p0 queue free %	100					100 94
cM capacity (veh/h)	728					263 677
Direction, Lane #	EB 1	WB 1	WB 2	WB 3	SB 1	
Volume Total	22	358	358	219	43	
Volume Left	0	0	0	0	0	
Volume Right	0	0	0	40	43	
cSH	1700	1700	1700	1700	677	
Volume to Capacity	0.01	0.21	0.21	0.13	0.06	
Queue Length 95th (ft)	0	0	0	0	0 5	
Control Delay (s)	0.0	0.0	0.0	0.0	10.7	
Lane LOS						B
Approach Delay (s)	0.0	0.0				10.7
Approach LOS						B
Intersection Summary						

Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	26.7%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis  
26: Mercer St & Site Driveway

2025 With Alt 3 - PM Peak Hour  
500 Fifth Avenue North



Movement	EBT	EBR	WBT	WBR	NBT	NBR
Lane Configurations	TTL					
Sign Control	Free					
Grade	0%					
Volume (veh/h)	1917	7	0	0	0	307
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	2130	8	0	0	0	341
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage (veh)						
Upstream signal (ft)	646	646				
pX, platoon unblocked						0.97 0.97
vC, conflicting volume						2138 2134 536
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol						2088 2084 443
IC, single (s)						4.1 6.8 6.9
IC, 2 stage (s)						
IF (s)						2.2 3.5 3.3
p0 queue free %						100 100 38
cM capacity (veh/h)						255 45 548
Direction, Lane #	EB 1	EB 2	EB 3	EB 4	NB 1	
Volume Total	609	609	609	312	341	
Volume Left	0	0	0	0	0	
Volume Right	0	0	0	8	341	
cSH	1700	1700	1700	1700	548	
Volume to Capacity	0.36	0.36	0.36	0.18	0.62	
Queue Length 95th (ft)	0	0	0	0	106	
Control Delay (s)	0.0	0.0	0.0	0.0	21.8	
Lane LOS						C
Approach Delay (s)	0.0					21.8
Approach LOS						C

Intersection Summary			
Average Delay	3.0		
Intersection Capacity Utilization	53.6%	ICU Level of Service	A
Analysis Period (min)	15		

## Appendix C: Trip Generation Worksheets

# Trip Generation Worksheet - 500 Fifth Avenue North

7th edition

Alternative 2/3 - Opening

## Proposed Uses Person Trips

Land Use	Size	Trip Rate	Inbound %	ITE Total Veh Trips	Person Trips
<b>Corporate Headquarters Building (LU 714)</b>	<b>400,000 sfgfa</b>				<b>AVO = 1.2</b>
Daily		7.98 trips/1,000 sq.ft.	50%	3190	3830
AM Peak Hour		1.49 trips/1,000 sq.ft.	93%	595	715
PM Peak Hour		1.40 trips/1,000 sq.ft.	10%	560	670
<b>Specialty Retail (LU 814)</b>	<b>0 sfgfa</b>				<b>AVO = 1.0</b>
Daily		44.320 trips/1,000 sq. ft.	50%	0	0
AM Peak Hour		3.690 trips/1,000 sq. ft.	48%	0	0
PM Peak Hour		2.710 trips/1,000 sq. ft.	44%	0	0
<b>General Light Industrial (LU 110)</b>	<b>0 sfgfa</b>				<b>AVO = 1.0</b>
Daily		6.970 trips/DU	50%	0	0
AM Peak Hour		0.920 trips/DU	88%	0	0
PM Peak Hour		0.980 trips/DU	12%	0	0
<b>Research and Development Center (LU 760)</b>	<b>0 sfgfa</b>				<b>AVO = 1.2</b>
Daily		8.11 trips/1,000 sq.ft.	50%	0	0
AM Peak Hour		1.24 trips/1,000 sq.ft.	83%	0	0
PM Peak Hour		1.08 trips/1,000 sq.ft.	15%	0	0

## Existing Uses Person Trips

Land Use	Existing Use is Parking Size	Trip Rate	Inbound %	ITE Total Veh Trips	Person Trips
<b>Corporate Headquarters Building (LU 714)</b>	<b>0 sfgfa</b>				<b>AVO = 1.2</b>
Daily		7.98 trips/1,000 sq.ft.	50%	0	0
AM Peak Hour		1.49 trips/1,000 sq.ft.	93%	0	0
PM Peak Hour		1.40 trips/1,000 sq.ft.	10%	0	0
<b>Specialty Retail (LU 814)</b>	<b>0 sfgfa</b>				<b>AVO = 1.0</b>
Daily		44.32 trips/1,000 sq.ft.	50%	0	0
AM Peak Hour		3.69 trips/1,000 sq.ft.	48%	0	0
PM Peak Hour		2.71 trips/1,000 sq.ft.	44%	0	0
<b>General Light Industrial (LU 110)</b>	<b>0 sfgfa</b>				<b>AVO = 1.0</b>
Daily		6.970 trips/DU	50%	0	0
AM Peak Hour		0.920 trips/DU	88%	0	0
PM Peak Hour		0.980 trips/DU	12%	0	0
<b>Research and Development Center (LU 760)</b>	<b>0 sfgfa</b>				<b>AVO = 1.2</b>
Daily		8.11 trips/1,000 sq.ft.	50%	0	0
AM Peak Hour		1.24 trips/1,000 sq.ft.	83%	0	0
PM Peak Hour		1.08 trips/1,000 sq.ft.	15%	0	0

## Net New Person Trips

Land Use	Size	Trip Rate	Inbound %	ITE Total Veh Trips	Person Trips
<b>Corporate Headquarters Building (LU 714)</b>	<b>400,000 sfgfa</b>				<b>AVO = 1.2</b>
Daily		7.98 trips/1,000 sq.ft.	50%	3190	3830
AM Peak Hour		1.49 trips/1,000 sq.ft.	93%	595	715
PM Peak Hour		1.40 trips/1,000 sq.ft.	10%	560	670
<b>Specialty Retail (LU 814)</b>	<b>0 sfgfa</b>				<b>AVO = 1.0</b>
Daily		44.32 trips/1,000 sq.ft.	50%	0	0
AM Peak Hour		3.69 trips/1,000 sq.ft.	48%	0	0
PM Peak Hour		2.71 trips/1,000 sq.ft.	44%	0	0
<b>General Light Industrial (LU 110)</b>	<b>0 sfgfa</b>				<b>AVO = 1.0</b>
Daily		6.970 trips/DU	50%	0	0
AM Peak Hour		0.920 trips/DU	88%	0	0
PM Peak Hour		0.980 trips/DU	12%	0	0
<b>Research and Development Center (LU 760)</b>	<b>0 sfgfa</b>				<b>AVO = 1.2</b>
Daily		8.11 trips/1,000 sq.ft.	50%	0	0
AM Peak Hour		1.24 trips/1,000 sq.ft.	83%	0	0
PM Peak Hour		1.08 trips/1,000 sq.ft.	15%	0	0

# 500 Fifth Avenue North

## Alternative 2/3 - Opening

### Total Person Trips by Mode of Travel

Trip Generation Summary	Percent of Peak Hour	Percent of Daily	Daily Person Trips	AM Peak Hour			PM Peak Hour		
				In	Out	Total	In	Out	Total
Office									
SOV	80%	80%	3065	530	40	570	55	480	535
Carpool	10%	10%	385	65	5	70	5	60	65
Transit/Non-Motorized	10%	10%	380	70	5	75	5	65	70
Total	100%	100%	3830	665	50	715	65	605	670
Retail									
SOV	80%	80%	0	0	0	0	0	0	0
Carpool	10%	10%	0	0	0	0	0	0	0
Transit/Non-Motorized	10%	10%	0	0	0	0	0	0	0
Total	100%	100%	0	0	0	0	0	0	0
Industrial									
SOV	80%	80%	0	0	0	0	0	0	0
Carpool	10%	10%	0	0	0	0	0	0	0
Transit/Non-Motorized	10%	10%	0	0	0	0	0	0	0
Total	100%	100%	0	0	0	0	0	0	0
R & D Center									
SOV	80%	80%	0	0	0	0	0	0	0
Carpool	10%	10%	0	0	0	0	0	0	0
Transit/Non-Motorized	10%	10%	0	0	0	0	0	0	0
Total	100%	100%	0	0	0	0	0	0	0
Total Project Person Trips									
SOV			3065	530	40	570	55	480	535
Carpool			385	65	5	70	5	60	65
Transit/Non-Motorized			380	70	5	75	5	65	70
Total			3830	665	50	715	65	605	670

Trip Generation rates were obtained from Trip Generation (ITE, 7th Edition, 2003)

### Total Vehicle Trip Generation

Land Use	CP AVO		Daily Vehicle Trips	AM Peak Hour Vehicle Trips			PM Peak Hour Vehicle Trips		
				In	Out	Total	In	Out	Total
Office	2.30		3230	560	40	600	55	510	565
Retail	2.30		0	0	0	0	0	0	0
Industrial	2.30		0	0	0	0	0	0	0
R & D Center	2.30		0	0	0	0	0	0	0
Total			3230	560	40	600	55	510	565

### Equivalent Trip Rates

Land Use			Daily Vehicle Trips	AM Peak Hour Vehicle Trips		PM Peak Hour Vehicle Trips	
				Total		Total	
Office			8.08	1.50		1.41	
Retail			#DIV/0!	#DIV/0!		#DIV/0!	
Industrial			#DIV/0!	#DIV/0!		#DIV/0!	
R & D Center			#DIV/0!	#DIV/0!		#DIV/0!	

# 500 Fifth Avenue North

Alternative 2/3 - Opening

## Net New Person Trips by Mode of Travel

Trip Generation Summary	Percent of Peak Hour	Percent of Daily	Daily Person Trips	AM Peak Hour			PM Peak Hour		
				In	Out	Total	In	Out	Total
Office									
SOV	80%	80%	3065	530	40	570	55	480	535
Carpool	10%	10%	385	65	5	70	5	60	65
Transit/Non-Motorized	10%	10%	380	70	5	75	5	65	70
Total	100%	100%	3830	665	50	715	65	605	670
Retail									
SOV	80%	80%	0	0	0	0	0	0	0
Carpool	10%	10%	0	0	0	0	0	0	0
Transit/Non-Motorized	10%	10%	0	0	0	0	0	0	0
Total	100%	100%	0	0	0	0	0	0	0
Industrial									
SOV	80%	80%	0	0	0	0	0	0	0
Carpool	10%	10%	0	0	0	0	0	0	0
Transit/Non-Motorized	10%	10%	0	0	0	0	0	0	0
Total	100%	100%	0	0	0	0	0	0	0
R & D Center									
SOV	80%	80%	0	0	0	0	0	0	0
Carpool	10%	10%	0	0	0	0	0	0	0
Transit/Non-Motorized	10%	10%	0	0	0	0	0	0	0
Total	100%	100%	0	0	0	0	0	0	0
Total Project Person Trips									
SOV			3065	530	40	570	55	480	535
Carpool			385	65	5	70	5	60	65
Transit/Non-Motorized			380	70	5	75	5	65	70
Total			3830	665	50	715	65	605	670

Trip Generation rates were obtained from Trip Generation (ITE, 7th Edition, 2003)

## Net New Vehicle Trip Generation

Land Use	CP AVO		Daily Vehicle Trips	AM Peak Hour Vehicle Trips			PM Peak Hour Vehicle Trips		
				In	Out	Total	In	Out	Total
Office	2.30		3230	560	40	600	55	510	565
Retail	2.30		0	0	0	0	0	0	0
Industrial	2.30		0	0	0	0	0	0	0
R & D Center	2.30		0	0	0	0	0	0	0
Total			3230	560	40	600	55	510	565

# Trip Generation Worksheet - 500 Fifth Avenue North

7th edition

Alternative 2 - Build Out

## Proposed Uses Person Trips

Land Use	Size	Trip Rate	Inbound %	ITE Total Veh Trips	Person Trips
Corporate Headquarters Building (LU 714)	1,000,000 sfgfa				AVO = 1.2
Daily		7.98 trips/1,000 sq.ft.	50%	7980	9575
AM Peak Hour		1.49 trips/1,000 sq.ft.	93%	1490	1790
PM Peak Hour		1.40 trips/1,000 sq.ft.	10%	1400	1680
Specialty Retail (LU 814)	0 sfgfa				AVO = 1.0
Daily		44.320 trips/1,000 sq. ft.	50%	0	0
AM Peak Hour		3.690 trips/1,000 sq. ft.	48%	0	0
PM Peak Hour		2.710 trips/1,000 sq. ft.	44%	0	0
General Light Industrial (LU 110)	0 sfgfa				AVO = 1.0
Daily		6.970 trips/DU	50%	0	0
AM Peak Hour		0.920 trips/DU	88%	0	0
PM Peak Hour		0.980 trips/DU	12%	0	0
Research and Development Center (LU 760)	0 sfgfa				AVO = 1.2
Daily		8.11 trips/1,000 sq.ft.	50%	0	0
AM Peak Hour		1.24 trips/1,000 sq.ft.	83%	0	0
PM Peak Hour		1.08 trips/1,000 sq.ft.	15%	0	0

## Existing Uses Person Trips

Land Use	Existing Use is Parking Size	Trip Rate	Inbound %	ITE Total Veh Trips	Person Trips
Corporate Headquarters Building (LU 714)	0 sfgfa				AVO = 1.2
Daily		7.98 trips/1,000 sq.ft.	50%	0	0
AM Peak Hour		1.49 trips/1,000 sq.ft.	93%	0	0
PM Peak Hour		1.40 trips/1,000 sq.ft.	10%	0	0
Specialty Retail (LU 814)	0 sfgfa				AVO = 1.0
Daily		44.32 trips/1,000 sq.ft.	50%	0	0
AM Peak Hour		3.69 trips/1,000 sq.ft.	48%	0	0
PM Peak Hour		2.71 trips/1,000 sq.ft.	44%	0	0
General Light Industrial (LU 110)	0 sfgfa				AVO = 1.0
Daily		6.970 trips/DU	50%	0	0
AM Peak Hour		0.920 trips/DU	88%	0	0
PM Peak Hour		0.980 trips/DU	12%	0	0
Research and Development Center (LU 760)	0 sfgfa				AVO = 1.2
Daily		8.11 trips/1,000 sq.ft.	50%	0	0
AM Peak Hour		1.24 trips/1,000 sq.ft.	83%	0	0
PM Peak Hour		1.08 trips/1,000 sq.ft.	15%	0	0

## Net New Person Trips

Land Use	Size	Trip Rate	Inbound %	ITE Total Veh Trips	Person Trips
Corporate Headquarters Building (LU 714)	1,000,000 sfgfa				AVO = 1.2
Daily		7.98 trips/1,000 sq.ft.	50%	7980	9575
AM Peak Hour		1.49 trips/1,000 sq.ft.	93%	1490	1790
PM Peak Hour		1.40 trips/1,000 sq.ft.	10%	1400	1680
Specialty Retail (LU 814)	0 sfgfa				AVO = 1.0
Daily		44.32 trips/1,000 sq.ft.	50%	0	0
AM Peak Hour		3.69 trips/1,000 sq.ft.	48%	0	0
PM Peak Hour		2.71 trips/1,000 sq.ft.	44%	0	0
General Light Industrial (LU 110)	0 sfgfa				AVO = 1.0
Daily		6.970 trips/DU	50%	0	0
AM Peak Hour		0.920 trips/DU	88%	0	0
PM Peak Hour		0.980 trips/DU	12%	0	0
Research and Development Center (LU 760)	0 sfgfa				AVO = 1.2
Daily		8.11 trips/1,000 sq.ft.	50%	0	0
AM Peak Hour		1.24 trips/1,000 sq.ft.	83%	0	0
PM Peak Hour		1.08 trips/1,000 sq.ft.	15%	0	0

# 500 Fifth Avenue North

## Alternative 2 - Build Out

### Total Person Trips by Mode of Travel

Trip Generation Summary	Percent of Peak Hour	Percent of Daily	Daily Person Trips	AM Peak Hour			PM Peak Hour		
				In	Out	Total	In	Out	Total
Office									
SOV	50%	50%	4790	830	65	895	85	755	840
Carpool	20%	20%	1915	335	25	360	35	300	335
Transit/Non-Motorized	30%	30%	2870	500	35	535	50	455	505
Total	100%	100%	9575	1665	125	1790	170	1510	1680
Retail									
SOV	70%	70%	0	0	0	0	0	0	0
Carpool	15%	15%	0	0	0	0	0	0	0
Transit/Non-Motorized	15%	15%	0	0	0	0	0	0	0
Total	100%	100%	0	0	0	0	0	0	0
Industrial									
SOV	70%	70%	0	0	0	0	0	0	0
Carpool	15%	15%	0	0	0	0	0	0	0
Transit/Non-Motorized	15%	15%	0	0	0	0	0	0	0
Total	100%	100%	0	0	0	0	0	0	0
R & D Center									
SOV	70%	70%	0	0	0	0	0	0	0
Carpool	15%	15%	0	0	0	0	0	0	0
Transit/Non-Motorized	15%	15%	0	0	0	0	0	0	0
Total	100%	100%	0	0	0	0	0	0	0
Total Project Person Trips									
SOV			4790	830	65	895	85	755	840
Carpool			1915	335	25	360	35	300	335
Transit/Non-Motorized			2870	500	35	535	50	455	505
Total			9575	1665	125	1790	170	1510	1680

Trip Generation rates were obtained from Trip Generation (ITE, 7th Edition, 2003)

### Total Vehicle Trip Generation

Land Use	CP AVO		Daily Vehicle Trips	AM Peak Hour Vehicle Trips			PM Peak Hour Vehicle Trips		
				In	Out	Total	In	Out	Total
Office	2.30		5625	975	75	1050	100	885	985
Retail	2.30		0	0	0	0	0	0	0
Industrial	2.30		0	0	0	0	0	0	0
R & D Center	2.30		0	0	0	0	0	0	0
Total			5625	975	75	1050	100	885	985

### Equivalent Trip Rates

Land Use			Daily Vehicle Trips	AM Peak Hour Vehicle Trips		PM Peak Hour Vehicle Trips	
				Total		Total	
Office			5.63	1.05		0.99	
Retail			#DIV/0!	#DIV/0!		#DIV/0!	
Industrial			#DIV/0!	#DIV/0!		#DIV/0!	
R & D Center			#DIV/0!	#DIV/0!		#DIV/0!	



# 500 Fifth Avenue North

## Alternative 2 - Build Out

### Net New Person Trips by Mode of Travel

Trip Generation Summary	Percent of Peak Hour	Percent of Daily	Daily Person Trips	AM Peak Hour			PM Peak Hour		
				In	Out	Total	In	Out	Total
Office									
SOV	50%	50%	4790	830	65	895	85	755	840
Carpool	20%	20%	1915	335	25	360	35	300	335
Transit/Non-Motorized	30%	30%	2870	500	35	535	50	455	505
Total	100%	100%	9575	1665	125	1790	170	1510	1680
Retail									
SOV	70%	70%	0	0	0	0	0	0	0
Carpool	15%	15%	0	0	0	0	0	0	0
Transit/Non-Motorized	15%	15%	0	0	0	0	0	0	0
Total	100%	100%	0	0	0	0	0	0	0
Industrial									
SOV	70%	70%	0	0	0	0	0	0	0
Carpool	15%	15%	0	0	0	0	0	0	0
Transit/Non-Motorized	15%	15%	0	0	0	0	0	0	0
Total	100%	100%	0	0	0	0	0	0	0
R & D Center									
SOV	70%	70%	0	0	0	0	0	0	0
Carpool	15%	15%	0	0	0	0	0	0	0
Transit/Non-Motorized	15%	15%	0	0	0	0	0	0	0
Total	100%	100%	0	0	0	0	0	0	0
Total Project Person Trips									
SOV			4790	830	65	895	85	755	840
Carpool			1915	335	25	360	35	300	335
Transit/Non-Motorized			2870	500	35	535	50	455	505
Total			9575	1665	125	1790	170	1510	1680

Trip Generation rates were obtained from Trip Generation (ITE, 7th Edition, 2003)

### Net New Vehicle Trip Generation

Land Use	CP AVO		Daily Vehicle Trips	AM Peak Hour Vehicle Trips			PM Peak Hour Vehicle Trips		
				In	Out	Total	In	Out	Total
Office	2.30		5625	975	75	1050	100	885	985
Retail	2.30		0	0	0	0	0	0	0
Industrial	2.30		0	0	0	0	0	0	0
R & D Center	2.30		0	0	0	0	0	0	0
Total			5625	975	75	1050	100	885	985

# Trip Generation Worksheet - 500 Fifth Avenue North

7th edition

## Alternative 3 - Build Out

### Proposed Uses Person Trips

Land Use	Size	Trip Rate	Inbound %	ITE Total Veh Trips	Person Trips
<b>Corporate Headquarters Building (LU 714)</b>	<b>900,000 sfgfa</b>				<b>AVO = 1.2</b>
Daily		7.98 trips/1,000 sq. ft.	50%	7180	8615
AM Peak Hour		1.49 trips/1,000 sq. ft.	93%	1340	1610
PM Peak Hour		1.40 trips/1,000 sq. ft.	10%	1260	1510
<b>Specialty Retail (LU 814)</b>	<b>0 sfgfa</b>				<b>AVO = 1.0</b>
Daily		44.32 trips/1,000 sq. ft.	50%	0	0
AM Peak Hour		3.69 trips/1,000 sq. ft.	48%	0	0
PM Peak Hour		2.71 trips/1,000 sq. ft.	44%	0	0
<b>General Light Industrial (LU 110)</b>	<b>0 sfgfa</b>				<b>AVO = 1.0</b>
Daily		6.970 trips/DU	50%	0	0
AM Peak Hour		0.920 trips/DU	88%	0	0
PM Peak Hour		0.980 trips/DU	12%	0	0
<b>Research and Development Center (LU 760)</b>	<b>0 sfgfa</b>				<b>AVO = 1.2</b>
Daily		8.11 trips/1,000 sq. ft.	50%	0	0
AM Peak Hour		1.24 trips/1,000 sq. ft.	83%	0	0
PM Peak Hour		1.08 trips/1,000 sq. ft.	15%	0	0

### Existing Uses Person Trips

Land Use	Existing Use is Parking Size	Trip Rate	Inbound %	ITE Total Veh Trips	Person Trips
<b>Corporate Headquarters Building (LU 714)</b>	<b>0 sfgfa</b>				<b>AVO = 1.2</b>
Daily		7.98 trips/1,000 sq. ft.	50%	0	0
AM Peak Hour		1.49 trips/1,000 sq. ft.	93%	0	0
PM Peak Hour		1.40 trips/1,000 sq. ft.	10%	0	0
<b>Specialty Retail (LU 814)</b>	<b>0 sfgfa</b>				<b>AVO = 1.0</b>
Daily		44.32 trips/1,000 sq. ft.	50%	0	0
AM Peak Hour		3.69 trips/1,000 sq. ft.	48%	0	0
PM Peak Hour		2.71 trips/1,000 sq. ft.	44%	0	0
<b>General Light Industrial (LU 110)</b>	<b>0 sfgfa</b>				<b>AVO = 1.0</b>
Daily		6.970 trips/DU	50%	0	0
AM Peak Hour		0.920 trips/DU	88%	0	0
PM Peak Hour		0.980 trips/DU	12%	0	0
<b>Research and Development Center (LU 760)</b>	<b>0 sfgfa</b>				<b>AVO = 1.2</b>
Daily		8.11 trips/1,000 sq. ft.	50%	0	0
AM Peak Hour		1.24 trips/1,000 sq. ft.	83%	0	0
PM Peak Hour		1.08 trips/1,000 sq. ft.	15%	0	0

### Net New Person Trips

Land Use	Size	Trip Rate	Inbound %	ITE Total Veh Trips	Person Trips
<b>Corporate Headquarters Building (LU 714)</b>	<b>900,000 sfgfa</b>				<b>AVO = 1.2</b>
Daily		7.98 trips/1,000 sq. ft.	50%	7180	8615
AM Peak Hour		1.49 trips/1,000 sq. ft.	93%	1340	1610
PM Peak Hour		1.40 trips/1,000 sq. ft.	10%	1260	1510
<b>Specialty Retail (LU 814)</b>	<b>0 sfgfa</b>				<b>AVO = 1.0</b>
Daily		44.32 trips/1,000 sq. ft.	50%	0	0
AM Peak Hour		3.69 trips/1,000 sq. ft.	48%	0	0
PM Peak Hour		2.71 trips/1,000 sq. ft.	44%	0	0
<b>General Light Industrial (LU 110)</b>	<b>0 sfgfa</b>				<b>AVO = 1.0</b>
Daily		6.970 trips/DU	50%	0	0
AM Peak Hour		0.920 trips/DU	88%	0	0
PM Peak Hour		0.980 trips/DU	12%	0	0
<b>Research and Development Center (LU 760)</b>	<b>0 sfgfa</b>				<b>AVO = 1.2</b>
Daily		8.11 trips/1,000 sq. ft.	50%	0	0
AM Peak Hour		1.24 trips/1,000 sq. ft.	83%	0	0
PM Peak Hour		1.08 trips/1,000 sq. ft.	15%	0	0

Specialty retail trip rate based on ratio of PM peak hour of generator to peak hour of street applied to AM peak hour of generator.

# 500 Fifth Avenue North

## Alternative 3 - Build Out

### Total Person Trips by Mode of Travel

Trip Generation Summary	Percent of Peak Hour	Percent of Daily	Daily Person Trips	AM Peak Hour			PM Peak Hour		
				In	Out	Total	In	Out	Total
Office									
SOV	50%	50%	4310	750	55	805	75	680	755
Carpool	20%	20%	1725	300	20	320	30	270	300
Transit/Non-Motorized	30%	30%	2580	445	40	485	45	410	455
Total	100%	100%	8615	1495	115	1610	150	1360	1510
Retail									
SOV	70%	70%	0	0	0	0	0	0	0
Carpool	15%	15%	0	0	0	0	0	0	0
Transit/Non-Motorized	15%	15%	0	0	0	0	0	0	0
Total	100%	100%	0	0	0	0	0	0	0
Industrial									
SOV	70%	70%	0	0	0	0	0	0	0
Carpool	15%	15%	0	0	0	0	0	0	0
Transit/Non-Motorized	15%	15%	0	0	0	0	0	0	0
Total	100%	100%	0	0	0	0	0	0	0
R & D Center									
SOV	70%	70%	0	0	0	0	0	0	0
Carpool	15%	15%	0	0	0	0	0	0	0
Transit/Non-Motorized	15%	15%	0	0	0	0	0	0	0
Total	100%	100%	0	0	0	0	0	0	0
Total Project Person Trips									
SOV			4310	750	55	805	75	680	755
Carpool			1725	300	20	320	30	270	300
Transit/Non-Motorized			2580	445	40	485	45	410	455
Total			8615	1495	115	1610	150	1360	1510

Trip Generation rates were obtained from: Trip Generation (ITE, 7th Edition, 2003)

### Total Vehicle Trip Generation

Land Use	CP AVO ' "		Daily Vehicle Trips	AM Peak Hour Vehicle Trips			PM Peak Hour Vehicle Trips		
				In	Out	Total	In	Out	Total
Office	2.30		5060	880	65	945	90	795	885
Retail	2.30		0	0	0	0	0	0	0
Industrial	2.30		0	0	0	0	0	0	0
R & D Center	2.30		0	0	0	0	0	0	0
Total			5060	880	65	945	90	795	885

### Equivalent Trip Rates

Land Use			Daily Vehicle Trips	AM Peak Hour Vehicle Trips		PM Peak Hour Vehicle Trips	
				Total		Total	
Office			5.62	1.05		0.98	
Retail			#DIV/0!	#DIV/0!		#DIV/0!	
Industrial			#DIV/0!	#DIV/0!		#DIV/0!	
R & D Center			#DIV/0!	#DIV/0!		#DIV/0!	

# 500 Fifth Avenue North

## Alternative 3 - Build Out

### Net New Person Trips by Mode of Travel

Trip Generation Summary	Percent of Peak Hour	Percent of Daily	Daily Person Trips	AM Peak Hour			PM Peak Hour		
				In	Out	Total	In	Out	Total
Office									
SOV	50%	50%	4310	750	55	805	75	680	755
Carpool	20%	20%	1725	300	20	320	30	270	300
Transit/Non-Motorized	30%	30%	2580	445	40	485	45	410	455
Total	100%	100%	8615	1495	115	1610	150	1360	1510
Retail									
SOV	70%	70%	0	0	0	0	0	0	0
Carpool	15%	15%	0	0	0	0	0	0	0
Transit/Non-Motorized	15%	15%	0	0	0	0	0	0	0
Total	100%	100%	0	0	0	0	0	0	0
Industrial									
SOV	70%	70%	0	0	0	0	0	0	0
Carpool	15%	15%	0	0	0	0	0	0	0
Transit/Non-Motorized	15%	15%	0	0	0	0	0	0	0
Total	100%	100%	0	0	0	0	0	0	0
R & D Center									
SOV	70%	70%	0	0	0	0	0	0	0
Carpool	15%	15%	0	0	0	0	0	0	0
Transit/Non-Motorized	15%	15%	0	0	0	0	0	0	0
Total	100%	100%	0	0	0	0	0	0	0
Total Project Person Trips									
SOV			4310	750	55	805	75	680	755
Carpool			1725	300	20	320	30	270	300
Transit/Non-Motorized			2580	445	40	485	45	410	455
Total			8615	1495	115	1610	150	1360	1510

Trip Generation rates were obtained from Trip Generation (ITE, 7th Edition, 2003)

### Net New Vehicle Trip Generation

Land Use	CP AVO '1	Daily Vehicle Trips	AM Peak Hour Vehicle Trips			PM Peak Hour Vehicle Trips		
			In	Out	Total	In	Out	Total
Office	2.30	5060	880	65	945	90	795	885
Retail	2.30	0	0	0	0	0	0	0
Industrial	2.30	0	0	0	0	0	0	0
R & D Center	2.30	0	0	0	0	0	0	0
Total		5060	880	65	945	90	795	885

## Appendix D:     Parking Calculation Worksheets

## Initial Phase - Alternative 2/3 PARKING DEMAND CALCULATIONS

### Initial TMP

Office Building Area	400,000	
Employee Density - Office	3.29	(employees/1,000 square feet)
<b>EMPLOYEES</b>	<b>1316</b>	

Percent Employees On-Site	85%
<b>EMPLOYEES ON-SITE</b>	<b>1119</b>

MODE SPLIT - Office		PEOPLE
SOV	80%	895
Carpool	10%	112
Transit/Other	10%	112

#### PARKING STALL DEMAND

Office = 400,000

Vehicles (AVO = 1.0/2.3)
Short-term office parking (0.10 Stalls/1,000 SF)
Office Subtotal

#### PARKING STALLS

944
40
<u>984</u>

**OFFICE PARKING DEMAND (STALLS) = 984**

## Initial Phase - Alternative 2/3 PARKING DEMAND CALCULATIONS

### Short-Term TMP

Office Building Area	400,000	
Employee Density - Office	3.29	(employees/1,000 square feet)
<b>EMPLOYEES</b>	<b>1316</b>	

Percent Employees On-Site	85%
<b>EMPLOYEES ON-SITE</b>	<b>1119</b>

MODE SPLIT - Office		PEOPLE
SOV	70%	783
Carpool	15%	168
Transit/Other	15%	168

#### PARKING STALL DEMAND

Office = 400,000

Vehicles (AVO = 1.0/2.3)
Short-term office parking (0.10 Stalls/1,000 SF)
Office Subtotal

#### PARKING STALLS

856
40
<b>896</b>

**OFFICE PARKING DEMAND (STALLS) = 896**



## Initial Phase - Alternative 2/3 PARKING DEMAND CALCULATIONS

### Long-Term TMP

Office Building Area	400,000	
Employee Density - Office	3.29	(employees/1,000 square feet)
<b>EMPLOYEES</b>	<b>1316</b>	

Percent Employees On-Site	85%
<b>EMPLOYEES ON-SITE</b>	<b>1119</b>

MODE SPLIT - Office		PEOPLE
SOV	50%	560
Carpool	20%	224
Transit/Other	30%	336

#### PARKING STALL DEMAND

Office = 400,000

Vehicles (AVO = 1.0/2.3)
Short-term office parking (0.10 Stalls/1,000 SF)
Office Subtotal

#### PARKING STALLS

657
40
<b>697</b>

**OFFICE PARKING DEMAND (STALLS) = 697**

**2020 Build Out - Alternative 2**  
**PARKING DEMAND CALCULATIONS**  
**100% Office**  
**Long-Term TMP**

Office Building Area	1,000,000	
Employee Density - Office	3.29	(employees/1,000 square feet)
<b>EMPLOYEES</b>	<b>3290</b>	

Percent Employees On-Site	85%
<b>EMPLOYEES ON-SITE</b>	<b>2797</b>

<b>MODE SPLIT - Office</b>		<b>PEOPLE</b>
SOV	50%	1399
Carpool	20%	559
Transit/Other	30%	839

<b><u>PARKING STALL DEMAND</u></b>		<b><u>PARKING STALLS</u></b>
	Office = 1,000,000	
Vehicles (AVO = 1.0/2.3)		1642
Short-term office parking (0.10 Stalls/1,000 SF)		100
Office Subtotal		<u>1742</u>

**TOTAL PARKING DEMAND (STALLS) = 1742**

**2020 Build Out - Alternative 3  
 PARKING DEMAND CALCULATIONS  
 100% Office  
 Long-Term TMP**

Office Building Area	900,000	
Employee Density - Office	3.29	(employees/1,000 square feet)
<b>EMPLOYEES</b>	<b>2961</b>	

Percent Employees On-Site	85%
<b>EMPLOYEES ON-SITE</b>	<b>2517</b>

<b>MODE SPLIT - Office</b>		<b>PEOPLE</b>
SOV	50%	1259
Carpool	20%	503
Transit/Other	30%	755

**PARKING STALL DEMAND**

Office = 900,000

Vehicles (AVO = 1.0/2.3)
Short-term office parking (0.10 Stalls/1,000 SF)
Office Subtotal

**PARKING STALLS**

1478
90
<b>1568</b>

**TOTAL PARKING DEMAND (STALLS) = 1568**

**Appendix B – Seattle Center Parking Utilization  
November 2003 – December 2004**

Seattle Center Parking Utilization

Percent Full						Weekday Available Spaces in Other Seattle Center Parking Facilities				
Day	Date	Shift	Fifth Ave % Full	MSG % Full	1st N % Full	MSG	total spaces 1439	1st Ave N	total spaces 654	Total Spaces Available
Wed	Wednesday, December 31, 2003	PM	100	5	1		# available		# available	
Thu	Thursday, March 18, 2004	AM	100	90	100	10%	143.9	0%	0	144
Sat	Saturday, March 20, 2004	AM	100	75	95					
Sat	Saturday, April 10, 2004	AM	100	20	85					
Sat	Saturday, May 29, 2004	AM	100	75	70					
Sun	Sunday, May 30, 2004	AM	100	70	55					
Mon	Monday, May 31, 2004	AM	100	60	40					
Fri	Friday, June 18, 2004	PM	100	60	100					
Sat	Saturday, July 17, 2004	PM	100	60	99					
Sun	Sunday, July 18, 2004	PM	100	53	60					
Mon	Monday, August 23, 2004	AM	100	90	100	10%	143.9	0%	0	144
Fri	Friday, September 03, 2004	PM	100	30	25					
Sat	Saturday, September 04, 2004	AM	100	35	50					
Sat	Saturday, September 04, 2004	PM	100	100	35					
Sun	Sunday, September 05, 2004	AM	100	88	29					
Mon	Monday, September 06, 2004	AM	100	40	20					
Fri	Friday, October 22, 2004	PM	100	95	95					
Sun	Sunday, March 28, 2004	PM	99	45	98					
Mon	Monday, August 23, 2004	PM	99	99	97					
Sun	Sunday, September 05, 2004	PM	98	85	55					
Fri	Friday, March 26, 2004	PM	95	30	90					
Fri	Friday, April 02, 2004	PM	95	55	97					
Sun	Sunday, May 30, 2004	PM	95	95	70					
Tue	Tuesday, August 24, 2004	AM	95	85	100	15%	215.85	0%	0	216
Tue	Tuesday, August 24, 2004	PM	92	80	90					
Fri	Friday, November 21, 2003	PM	90	90	85					
Fri	Friday, December 19, 2003	PM	90	90	65					
Sat	Saturday, December 27, 2003	PM	90	90	75					
Fri	Friday, March 12, 2004	PM	90	80	98					
Sat	Saturday, October 02, 2004	AM	90	75	80					
Sun	Sunday, October 10, 2004	AM	90	65	100					
Fri	Friday, November 26, 2004	PM	90	85	70					
Mon	Monday, November 29, 2004	AM	90	30	40	70%	1007.3	60%	392.4	1400
Sun	Sunday, November 30, 2003	AM	85	1	25					
Thu	Thursday, January 22, 2004	PM	85	75	60					
Sat	Saturday, January 24, 2004	PM	85	98	60					
Sun	Sunday, February 22, 2004	PM	85	45	65					
Thu	Thursday, March 18, 2004	PM	85	90	90					
Sat	Saturday, August 07, 2004	PM	85	85	97					
Tue	Tuesday, October 12, 2004	PM	85	60	100					
Fri	Friday, November 12, 2004	PM	85	90	85					
Sat	Saturday, November 29, 2003	PM	80	95	75					
Tue	Tuesday, January 13, 2004	PM	80	40	90					

Seattle Center Parking Utilization

Percent Full						Weekday Available Spaces in Other Seattle Center Parking Facilities				
Day	Date	Shift	Fifth Ave % Full	MSG % Full	1st N % Full	MSG	total spaces 1439	1st Ave N	total spaces 654	Total Spaces Available
Sat	Saturday, January 31, 2004	PM	80	50	65					
Fri	Friday, February 27, 2004	PM	80	35	92					
Mon	Monday, April 12, 2004	PM	80	35	75					
Tue	Tuesday, August 31, 2004	PM	80	40	98					
Fri	Friday, October 01, 2004	PM	80	60	55					
Fri	Friday, December 05, 2003	PM	75	80	70					
Sat	Saturday, December 13, 2003	AM	75	75	100					
Mon	Monday, January 12, 2004	PM	75	65	75					
Thu	Thursday, February 05, 2004	PM	75	85	90					
Thu	Thursday, February 19, 2004	PM	75	25	90					
Tue	Tuesday, July 27, 2004	PM	75	60	85					
Mon	Monday, August 30, 2004	PM	75	40	100					
Fri	Friday, September 03, 2004	AM	75	25	20	75%	1079.25	80%	523.2	1602
Sat	Saturday, November 27, 2004	AM	75	45	35					
Tue	Tuesday, March 09, 2004	PM	70	40	90					
Sat	Saturday, March 13, 2004	AM	70	20	25					
Sun	Sunday, March 21, 2004	PM	70	30	40					
Sat	Saturday, November 29, 2003	AM	65	35	65					
Sun	Sunday, December 14, 2003	AM	65	75	50					
Sat	Saturday, December 20, 2003	PM	65	75	3					
Tue	Tuesday, December 23, 2003	PM	65	85	80					
Sun	Sunday, December 28, 2003	AM	65	60	70					
Fri	Friday, January 02, 2004	PM	65	40	70					
Mon	Monday, January 05, 2004	PM	65	40	65					
Fri	Friday, January 09, 2004	PM	65	50	65					
Wed	Wednesday, February 25, 2004	PM	65	45	70					
Thu	Thursday, February 26, 2004	PM	65	50	70					
Thu	Thursday, April 08, 2004	PM	65	20	90					
Sat	Saturday, May 29, 2004	PM	65	70	75					
Mon	Monday, July 05, 2004	PM	65	40	98					
Fri	Friday, July 16, 2004	PM	65	20	50					
Sat	Saturday, August 07, 2004	AM	65	3	8					
Mon	Monday, August 30, 2004	AM	65	5	25	95%	1367.05	75%	490.5	2021
Sat	Saturday, November 06, 2004	PM	65	70	95					
Sun	Sunday, November 07, 2004	PM	65	35	70					
Wed	Wednesday, December 01, 2004	PM	65	45	80					
Tue	Tuesday, November 25, 2003	PM	60	45	55					
Sat	Saturday, January 24, 2004	AM	60	50	75					
Thu	Thursday, February 12, 2004	PM	60	80	60					
Sun	Sunday, February 15, 2004	AM	60	45	50					
Sun	Sunday, March 07, 2004	PM	60	25	55					
Wed	Wednesday, March 24, 2004	PM	60	40	85					
Sat	Saturday, March 27, 2004	AM	60	20	40					
Sun	Sunday, April 04, 2004	PM	60	15	65					

Seattle Center Parking Utilization

Percent Full						Weekday Available Spaces in Other Seattle Center Parking Facilities				
Day	Date	Shift	Fifth Ave % Full	MSG % Full	1st N % Full	MSG	total spaces 1439	1st Ave N	total spaces 654	Total Spaces Available
Sat	Saturday, April 24, 2004	AM	60	50	25	95%	1367.05	60%	392.4	1858
Sat	Saturday, June 12, 2004	AM	60	40	50					
Mon	Monday, August 09, 2004	AM	60	5	40					
Sat	Saturday, August 21, 2004	AM	60	10	3					
Fri	Friday, November 05, 2004	PM	60	85	80	95%	1367.05	80%	523.2	2054
Sat	Saturday, November 20, 2004	PM	60	70	45					
Sun	Sunday, November 28, 2004	PM	60	35	80					
Mon	Monday, February 02, 2004	PM	55	25	65					
Sat	Saturday, May 22, 2004	PM	55	65	98	97%	1395.83	92%	601.68	2161
Sat	Saturday, June 05, 2004	PM	55	85	25					
Sun	Sunday, July 04, 2004	AM	55	2	5					
Sun	Sunday, July 11, 2004	AM	55	4	3					
Sat	Saturday, July 24, 2004	PM	55	20	90	97%	1395.83	90%	588.6	2410
Sun	Sunday, August 01, 2004	PM	55	3	80					
Thu	Thursday, August 05, 2004	PM	55	12	95					
Sun	Sunday, August 15, 2004	AM	55	60	5					
Mon	Monday, August 16, 2004	AM	55	5	20	97%	1395.83	90%	588.6	2410
Wed	Wednesday, August 18, 2004	AM	55	3	8					
Sun	Sunday, August 22, 2004	AM	55	20	10					
Sun	Sunday, August 29, 2004	AM	55	2	5					
Tue	Tuesday, September 07, 2004	AM	55	3	10	97%	1395.83	90%	588.6	2410
Thu	Thursday, September 09, 2004	PM	55	10	95					
Sat	Saturday, September 18, 2004	PM	55	40	99					
Sat	Saturday, October 02, 2004	PM	55	55	40					
Sat	Saturday, October 23, 2004	AM	55	60	10	97%	1395.83	90%	588.6	2410
Fri	Friday, October 29, 2004	PM	55	90	65					
Sun	Sunday, November 14, 2004	PM	55	35	70					
Sun	Sunday, November 23, 2003	AM	50	75	35	40%	575.6	80%	523.2	1295
Fri	Friday, December 12, 2003	PM	50	70	20					
Fri	Friday, December 26, 2003	AM	50	60	20					
Sat	Saturday, December 27, 2003	AM	50	50	50					
Mon	Monday, December 29, 2003	AM	50	10	65	90%	1295.1	35%	228.9	1622
Tue	Tuesday, January 27, 2004	PM	50	25	55					
Sat	Saturday, February 21, 2004	PM	50	50	90					
Sat	Saturday, February 28, 2004	PM	50	80	80					
Sun	Sunday, February 29, 2004	PM	50	45	85	75%	1079.25	50%	327	1537
Sat	Saturday, March 13, 2004	PM	50	80	50					
Fri	Friday, April 09, 2004	AM	50	25	50					
Sat	Saturday, April 24, 2004	PM	50	45	3					
Sun	Sunday, May 02, 2004	AM	50	5	12	95%	1367.05	80%	523.2	1890
Fri	Friday, May 28, 2004	AM	50	5	20					
Mon	Monday, May 31, 2004	PM	50	45	20					
Sat	Saturday, June 19, 2004	AM	50	25	35					
Sat	Saturday, July 03, 2004	AM	50	5	8	90%	1295.1	85%	555.9	2113
Tue	Tuesday, July 20, 2004	AM	50	10	15					
Thu	Thursday, July 22, 2004	AM	50	5	100					
						95%	1367.05	0%	0	1367



Seattle Center Parking Utilization

Percent Full						Weekday Available Spaces in Other Seattle Center Parking Facilities				
Day	Date	Shift	Fifth Ave % Full	MSG % Full	1st N % Full	MSG	total spaces 1439	1st Ave N	total spaces 654	Total Spaces Available
Sun	Sunday, July 25, 2004	AM	50	1	3					
Tue	Tuesday, August 10, 2004	AM	50	10	10	90%	1295.1	90%	588.6	1982
Wed	Wednesday, August 11, 2004	AM	50	8	12	92%	1323.88	88%	575.52	1998
Thu	Thursday, August 12, 2004	AM	50	10	20	90%	1295.1	80%	523.2	1884
Tue	Tuesday, August 17, 2004	AM	50	3	15	97%	1395.83	85%	555.9	2017
Mon	Monday, September 13, 2004	PM	50	5	60					
Tue	Tuesday, September 14, 2004	AM	50	95	7	5%	71.95	93%	608.22	1073
Wed	Wednesday, November 10, 2004	PM	50	30	50					
Sat	Saturday, November 20, 2004	AM	50	75	30					
Sun	Sunday, November 21, 2004	PM	50	35	80					
Fri	Friday, November 26, 2004	AM	50	40	40	60%	863.4	60%	392.4	1256
Sat	Saturday, November 27, 2004	PM	50	85	50					
Sat	Saturday, November 22, 2003	AM	45	15	35					
Sun	Sunday, November 30, 2003	PM	45	75	80					
Sat	Saturday, December 06, 2003	PM	45	90	5					
Thu	Thursday, December 11, 2003	PM	45	10	15					
Sat	Saturday, December 13, 2003	PM	45	80	20					
Sun	Sunday, January 04, 2004	PM	45	2	65					
Wed	Wednesday, January 07, 2004	PM	45	25	40					
Sun	Sunday, March 14, 2004	PM	45	7	20					
Sat	Saturday, April 03, 2004	AM	45	10	15					
Sat	Saturday, April 17, 2004	AM	45	70	50					
Sat	Saturday, June 12, 2004	PM	45	45	10					
Sun	Sunday, June 13, 2004	AM	45	35	30					
Sat	Saturday, June 26, 2004	AM	45	10	25					
Mon	Monday, July 26, 2004	AM	45	5	5	95%	1367.05	95%	621.3	2250
Wed	Wednesday, July 28, 2004	AM	45	7	15	93%	1338.27	85%	555.9	2287
Thu	Thursday, July 29, 2004	AM	45	10	10	90%	1295.1	90%	588.6	2145
Fri	Friday, July 30, 2004	AM	45	5	15	95%	1367.05	85%	555.9	2185
Sun	Sunday, September 19, 2004	PM	45	5	80					
Sun	Sunday, October 03, 2004	AM	45	40	95					
Fri	Friday, November 19, 2004	PM	45	65	30					
Sat	Saturday, November 22, 2003	PM	40	55	35					
Wed	Wednesday, December 17, 2003	PM	40	80	70					
Sat	Saturday, December 20, 2003	AM	40	80	10					
Fri	Friday, December 26, 2003	PM	40	60	30					
Tue	Tuesday, December 30, 2003	AM	40	10	85	90%	1295.1	15%	98.1	1393
Fri	Friday, January 16, 2004	PM	40	70	25					
Fri	Friday, January 30, 2004	PM	40	85	65					
Tue	Tuesday, February 03, 2004	PM	40	40	98					
Sat	Saturday, February 14, 2004	AM	40	20	60					
Sat	Saturday, February 14, 2004	PM	40	65	45					
Tue	Tuesday, February 17, 2004	AM	40	10	35	90%	1295.1	65%	425.1	1720
Sat	Saturday, March 06, 2004	AM	40	10	65					
Sat	Saturday, April 03, 2004	PM	40	40	10					
Wed	Wednesday, April 14, 2004	PM	40	50	90					

Seattle Center Parking Utilization

Percent Full						Weekday Available Spaces in Other Seattle Center Parking Facilities				
Day	Date	Shift	Fifth Ave % Full	MSG % Full	1st N % Full	MSG	total spaces 1439	1st Ave N	total spaces 654	Total Spaces Available
Tue	Tuesday, May 11, 2004	AM	40	15	20	85%	1223.15	80%	523.2	1812
Sat	Saturday, May 15, 2004	AM	40	5	15					
Sat	Saturday, May 15, 2004	PM	40	45	15					
Sat	Saturday, June 19, 2004	PM	40	25	10					
Sat	Saturday, July 03, 2004	PM	40	15	80					
Mon	Monday, July 05, 2004	AM	40	3	5	97%	1395.83	95%	621.3	2377
Tue	Tuesday, July 06, 2004	AM	40	10	15	90%	1295.1	85%	555.9	2047
Tue	Tuesday, July 13, 2004	AM	40	4	10	96%	1381.44	90%	588.6	2166
Wed	Wednesday, July 21, 2004	AM	40	10	15	90%	1295.1	85%	555.9	2113
Fri	Friday, July 23, 2004	AM	40	8	10	92%	1323.88	90%	588.6	2239
Sat	Saturday, July 24, 2004	AM	40	20	25					
Sat	Saturday, July 31, 2004	PM	40	75	3					
Tue	Tuesday, August 03, 2004	AM	40	5	7	95%	1367.05	93%	608.22	2270
Sun	Sunday, August 08, 2004	AM	40	3	5					
Sat	Saturday, August 14, 2004	PM	40	8	12					
Thu	Thursday, August 19, 2004	AM	40	10	20	90%	1295.1	80%	523.2	1916
Fri	Friday, August 20, 2004	AM	40	5	15	95%	1367.05	85%	555.9	1988
Fri	Friday, August 27, 2004	AM	40	5	10	95%	1367.05	90%	588.6	2021
Mon	Monday, September 13, 2004	AM	40	5	7	95%	1367.05	93%	608.22	2335
Mon	Monday, September 27, 2004	PM	40	60	80					
Sat	Saturday, October 09, 2004	AM	40	35	50					
Sat	Saturday, October 09, 2004	PM	40	25	96					
Sun	Sunday, October 17, 2004	AM	40	65	45					
Sat	Saturday, October 23, 2004	PM	40	80	50					
Thu	Thursday, October 28, 2004	PM	40	45	80					
Sat	Saturday, October 30, 2004	PM	40	80	40					
Tue	Tuesday, November 30, 2004	AM	40	8	15	92%	1323.88	85%	555.9	2109
Sat	Saturday, December 06, 2003	AM	35	65	35	35%	503.65	65%	425.1	1256
Thu	Thursday, December 18, 2003	PM	35	65	25					
Mon	Monday, December 22, 2003	PM	35	45	2					
Wed	Wednesday, December 24, 2003	PM	35	65	20					
Fri	Friday, January 23, 2004	PM	35	95	60					
Sun	Sunday, January 25, 2004	AM	35	75	40					
Sat	Saturday, March 06, 2004	PM	35	90	75					
Thu	Thursday, April 08, 2004	AM	35	25	55	75%	1079.25	45%	294.3	1504
Sat	Saturday, April 10, 2004	PM	35	40	2					
Thu	Thursday, April 15, 2004	PM	35	65	60					
Fri	Friday, April 16, 2004	AM	35	40	50	60%	863.4	50%	327	1190
Sat	Saturday, May 01, 2004	AM	35	5	10					
Sat	Saturday, May 01, 2004	PM	35	25	20					
Fri	Friday, May 07, 2004	PM	35	25	50					
Sat	Saturday, May 08, 2004	PM	35	55	15					
Sun	Sunday, May 09, 2004	AM	35	45	7					
Mon	Monday, May 10, 2004	AM	35	10	15	90%	1295.1	85%	555.9	2211
Wed	Wednesday, May 12, 2004	AM	35	12	20	88%	1266.32	80%	523.2	2117
Fri	Friday, May 14, 2004	AM	35	15	40	85%	1223.15	60%	392.4	1812
Sat	Saturday, May 22, 2004	AM	35	20	25					

Seattle Center Parking Utilization

Percent Full						Weekday Available Spaces in Other Seattle Center Parking Facilities				
Day	Date	Shift	Fifth Ave % Full	MSG % Full	1st N % Full	MSG	total spaces 1439	1st Ave N	total spaces 654	Total Spaces Available
Sun	Sunday, June 06, 2004	AM	35	5	10					
Sun	Sunday, June 20, 2004	AM	35	5	10					
Fri	Friday, July 02, 2004	AM	35	10	15	90%	1295.1	85%	555.9	2080
Wed	Wednesday, July 07, 2004	AM	35	5	20	95%	1367.05	80%	523.2	2250
Thu	Thursday, July 08, 2004	AM	35	10	15	90%	1295.1	85%	555.9	2047
Mon	Monday, July 12, 2004	AM	35	3	10	97%	1395.83	90%	588.6	2115
Thu	Thursday, July 15, 2004	AM	35	10	10	90%	1295.1	90%	588.6	2080
Tue	Tuesday, July 27, 2004	AM	35	3	8	97%	1395.83	92%	601.68	2292
Mon	Monday, August 02, 2004	AM	35	5	20	95%	1367.05	80%	523.2	2217
Tue	Tuesday, August 03, 2004	PM	35	40	15					
Wed	Wednesday, August 04, 2004	AM	35	10	15	90%	1295.1	85%	555.9	1982
Fri	Friday, August 06, 2004	AM	35	10	85	90%	1295.1	15%	98.1	1426
Fri	Friday, August 13, 2004	PM	35	20	35					
Wed	Wednesday, August 25, 2004	AM	35	5	20	95%	1367.05	80%	523.2	1956
Thu	Thursday, August 26, 2004	AM	35	10	15	90%	1295.1	85%	555.9	1949
Sat	Saturday, August 28, 2004	AM	35	10	15					
Tue	Tuesday, August 31, 2004	AM	35	10	15	90%	1295.1	85%	555.9	2047
Wed	Wednesday, September 01, 2004	PM	35	30	98					
Thu	Thursday, September 02, 2004	AM	35	4	20	96%	1381.44	80%	523.2	2101
Wed	Wednesday, September 08, 2004	PM	35	7	75					
Sun	Sunday, September 12, 2004	AM	35	2	3					
Sat	Saturday, September 25, 2004	PM	35	45	5					
Sun	Sunday, September 26, 2004	AM	35	2	5					
Tue	Tuesday, September 28, 2004	PM	35	20	96					
Tue	Tuesday, October 19, 2004	PM	35	35	70					
Sun	Sunday, October 31, 2004	AM	35	20	5					
Sat	Saturday, November 13, 2004	PM	35	75	50					
Tue	Tuesday, December 02, 2003	AM	30	10	25	90%	1295.1	75%	490.5	2145
Wed	Wednesday, December 03, 2003	PM	30	35	60					
Sat	Saturday, February 07, 2004	AM	30	40	30					
Tue	Tuesday, February 10, 2004	PM	30	40	80					
Thu	Thursday, February 19, 2004	AM	30	20	60	80%	1151.2	40%	261.6	1413
Fri	Friday, February 20, 2004	AM	30	15	60	85%	1223.15	40%	261.6	1583
Fri	Friday, February 27, 2004	AM	30	15	25	85%	1223.15	75%	490.5	1910
Thu	Thursday, March 04, 2004	AM	30	10	50	90%	1295.1	50%	327	1949
Fri	Friday, March 05, 2004	PM	30	70	65					
Sun	Sunday, March 07, 2004	AM	30	40	25					
Fri	Friday, March 26, 2004	AM	30	10	25	90%	1295.1	75%	490.5	1916
Tue	Tuesday, April 06, 2004	AM	30	20	20	80%	1151.2	80%	523.2	1805
Wed	Wednesday, April 07, 2004	AM	30	20	30	80%	1151.2	70%	457.8	1707
Sun	Sunday, April 18, 2004	AM	30	40	20					
Mon	Monday, April 26, 2004	AM	30	6	5	94%	1352.66	95%	621.3	2464
Tue	Tuesday, April 27, 2004	AM	30	5	10	95%	1367.05	90%	588.6	2283
Sun	Sunday, May 16, 2004	AM	30	25	50	75%	1079.25	50%	327	1635
Fri	Friday, May 28, 2004	PM	30	20	10					
Tue	Tuesday, June 08, 2004	AM	30	10	8	90%	1295.1	92%	601.68	2289
Wed	Wednesday, June 09, 2004	PM	30	10	5					

Seattle Center Parking Utilization

Percent Full						Weekday Available Spaces in Other Seattle Center Parking Facilities				
Day	Date	Shift	Fifth Ave % Full	MSG % Full	1st N % Full	MSG	total spaces 1439	1st Ave N	total spaces 654	Total Spaces Available
Fri	Friday, June 11, 2004	PM	30	55	85					
Mon	Monday, June 14, 2004	AM	30	10	15	90%	1295.1	85%	555.9	2047
Tue	Tuesday, June 15, 2004	AM	30	8	5	92%	1323.88	95%	621.3	2338
Wed	Wednesday, June 23, 2004	AM	30	15	20	85%	1223.15	80%	523.2	2008
Fri	Friday, June 25, 2004	AM	30	15	10	85%	1223.15	90%	588.6	2073
Sat	Saturday, June 26, 2004	PM	30	60	10					
Thu	Thursday, July 01, 2004	PM	30	10	85					
Fri	Friday, July 09, 2004	PM	30	10	10					
Wed	Wednesday, July 14, 2004	AM	30	10	10	90%	1295.1	90%	588.6	2015
Thu	Thursday, August 05, 2004	AM	30	2	45	98%	1410.22	55%	359.7	1835
Thu	Thursday, August 12, 2004	PM	30	35	5					
Fri	Friday, October 08, 2004	AM	30	30	40	70%	1007.3	60%	392.4	1531
Sat	Saturday, October 16, 2004	PM	30	80	55					
Sun	Sunday, October 24, 2004	AM	30	8	60					
Thu	Thursday, November 04, 2004	AM	30	10	15	90%	1295.1	85%	555.9	2015
Fri	Friday, November 05, 2004	AM	30	40	25	60%	863.4	75%	490.5	1616
Fri	Friday, November 19, 2004	AM	30	40	15	60%	863.4	85%	555.9	1648
Wed	Wednesday, November 19, 2003	AM	25	10	20	90%	1295.1	80%	523.2	2243
Fri	Friday, November 28, 2003	PM	25	80	70					
Sun	Sunday, December 21, 2003	AM	25	35	15					
Sun	Sunday, January 04, 2004	AM	25	2	1					
Mon	Monday, January 05, 2004	AM	25	10	15	90%	1295.1	85%	555.9	2211
Sun	Sunday, January 11, 2004	PM	25	75	25					
Mon	Monday, January 26, 2004	AM	25	5	10	95%	1367.05	90%	588.6	2250
Sat	Saturday, January 31, 2004	AM	25	10	12					
Sat	Saturday, February 21, 2004	AM	25	15	20					
Sat	Saturday, February 28, 2004	AM	25	9	5					
Sun	Sunday, February 29, 2004	AM	25	40	25					
Wed	Wednesday, March 31, 2004	AM	25	5	20	95%	1367.05	80%	523.2	2348
Fri	Friday, April 02, 2004	AM	25	20	25	80%	1151.2	75%	490.5	2198
Sun	Sunday, April 04, 2004	AM	25	10	10					
Wed	Wednesday, April 14, 2004	PM	25	5	45					
Mon	Monday, April 19, 2004	PM	25	5	7					
Wed	Wednesday, April 21, 2004	AM	25	5	7	95%	1367.05	93%	608.22	2433
Fri	Friday, April 23, 2004	PM	25	40	25					
Wed	Wednesday, April 28, 2004	AM	25	20	10	80%	1151.2	90%	588.6	2001
Thu	Thursday, April 29, 2004	AM	25	20	50	80%	1151.2	50%	327	1609
Tue	Tuesday, May 04, 2004	PM	25	15	20					
Mon	Monday, May 17, 2004	AM	25	5	7	95%	1367.05	93%	608.22	2335
Fri	Friday, May 21, 2004	AM	25	15	15	85%	1223.15	85%	555.9	2008
Sun	Sunday, May 23, 2004	AM	25	25	15					
Thu	Thursday, June 03, 2004	PM	25	50	60					
Wed	Wednesday, June 09, 2004	AM	25	10	15	90%	1295.1	85%	555.9	2113
Fri	Friday, June 18, 2004	AM	25	5	10	95%	1367.05	90%	588.6	2446
Tue	Tuesday, June 22, 2004	AM	25	10	15	90%	1295.1	85%	555.9	2178
Tue	Tuesday, June 29, 2004	AM	25	10	15	90%	1295.1	85%	555.9	2178
Wed	Wednesday, June 30, 2004	AM	25	15	20	85%	1223.15	80%	523.2	2008

Seattle Center Parking Utilization

Percent Full						Weekday Available Spaces in Other Seattle Center Parking Facilities				
Day	Date	Shift	Fifth Ave % Full	MSG % Full	1st N % Full	MSG	total spaces 1439	1st Ave N	total spaces 654	Total Spaces Available
Fri	Friday, July 09, 2004	AM	25	5	10	95%	1367.05	90%	588.6	2413
Sat	Saturday, July 10, 2004	AM	25	10	10					
Fri	Friday, July 23, 2004	PM	25	10	10					
Wed	Wednesday, July 28, 2004	PM	25	15	10					
Sat	Saturday, August 21, 2004	PM	25	75	10					
Sat	Saturday, August 28, 2004	PM	25	2	5					
Wed	Wednesday, September 08, 2004	AM	25	8	10	92%	1323.88	90%	588.6	2370
Fri	Friday, September 10, 2004	AM	25	15	10	85%	1223.15	90%	588.6	2139
Sat	Saturday, September 11, 2004	AM	25	10	5					
Wed	Wednesday, September 15, 2004	AM	25	3	10	97%	1395.83	90%	588.6	2442
Sat	Saturday, October 16, 2004	AM	25	25	60					
Mon	Monday, November 08, 2004	AM	25	15	8	85%	1223.15	92%	601.68	2250
Thu	Thursday, November 11, 2004	AM	25	5	60	95%	1367.05	40%	261.6	1629
Fri	Friday, November 12, 2004	AM	25	15	20	85%	1223.15	80%	523.2	1746
Wed	Wednesday, November 17, 2004	AM	25	10	10	90%	1295.1	90%	588.6	2211
Thu	Thursday, November 18, 2004	AM	25	10	10	90%	1295.1	90%	588.6	2145
Tue	Tuesday, November 23, 2004	AM	25	10	15	90%	1295.1	85%	555.9	2015
Mon	Monday, November 29, 2004	AM	25	3	7	87%	1251.93	93%	608.22	2220
Wed	Wednesday, December 10, 2003	PM	20	65	15					
Sat	Saturday, January 10, 2004	PM	20	75	65					
Fri	Friday, January 16, 2004	PM	20	10	10					
Sat	Saturday, January 17, 2004	PM	20	80	5					
Tue	Tuesday, January 20, 2004	AM	20	5	5	95%	1367.05	95%	621.3	2544
Fri	Friday, January 23, 2004	AM	20	20	15	80%	1151.2	85%	555.9	2263
Sun	Sunday, January 25, 2004	PM	20	75	55					
Wed	Wednesday, January 28, 2004	PM	20	10	10					
Wed	Wednesday, January 28, 2004	PM	20	65	10					
Thu	Thursday, January 29, 2004	PM	20	10	10					
Mon	Monday, February 02, 2004	AM	20	15	25	85%	1223.15	75%	490.5	2237
Wed	Wednesday, February 04, 2004	PM	20	20	10					
Thu	Thursday, February 05, 2004	PM	20	10	10					
Fri	Friday, February 06, 2004	AM	20	10	10	90%	1295.1	90%	588.6	2309
Fri	Friday, February 06, 2004	PM	20	30	60					
Tue	Tuesday, February 10, 2004	AM	20	5	10	95%	1367.05	90%	588.6	2413
Sun	Sunday, February 15, 2004	PM	20	10	15					
Mon	Monday, February 16, 2004	AM	20	5	70	95%	1367.05	30%	196.2	1596
Wed	Wednesday, March 03, 2004	AM	20	3	10	97%	1395.83	90%	588.6	2213
Wed	Wednesday, March 03, 2004	PM	20	50	5					
Fri	Friday, March 05, 2004	AM	20	10	65	90%	1295.1	35%	228.9	1982
Wed	Wednesday, March 17, 2004	AM	20	7	10	93%	1338.27	90%	588.6	2221
Fri	Friday, March 19, 2004	PM	20	50	5					
Mon	Monday, March 22, 2004	AM	20	10	15	90%	1295.1	85%	555.9	2374
Tue	Tuesday, March 23, 2004	AM	20	20	15	80%	1151.2	85%	555.9	1805
Wed	Wednesday, March 24, 2004	AM	20	3	12	97%	1395.83	88%	575.52	2364
Thu	Thursday, April 01, 2004	AM	20	20	20	80%	1151.2	80%	523.2	2165
Mon	Monday, April 05, 2004	AM	20	15	20	85%	1223.15	80%	523.2	2237
Tue	Tuesday, April 13, 2004	AM	20	10	65	90%	1295.1	35%	228.9	1655

Seattle Center Parking Utilization

Percent Full						Weekday Available Spaces in Other Seattle Center Parking Facilities				
Day	Date	Shift	Fifth Ave % Full	MSG % Full	1st N % Full	MSG	total spaces 1439	1st Ave N	total spaces 654	Total Spaces Available
Fri	Friday, April 16, 2004	PM	20	65	25					
Tue	Tuesday, April 20, 2004	AM	20	20	25	80%	1151.2	75%	490.5	2100
Tue	Tuesday, May 04, 2004	AM	20	5	12	95%	1367.05	88%	575.52	2237
Sat	Saturday, May 08, 2004	AM	20	20	15					
Wed	Wednesday, May 12, 2004	PM	20	50	15					
Tue	Tuesday, May 18, 2004	AM	20	15	15	85%	1223.15	85%	555.9	2270
Mon	Monday, May 24, 2004	AM	20	10	15	90%	1295.1	85%	555.9	2309
Wed	Wednesday, May 26, 2004	AM	20	8	12	92%	1323.88	88%	575.52	2194
Thu	Thursday, May 27, 2004	AM	20	15	10	85%	1223.15	90%	588.6	2073
Tue	Tuesday, June 01, 2004	AM	20	10	10	90%	1295.1	90%	588.6	2276
Wed	Wednesday, June 02, 2004	AM	20	15	10	85%	1223.15	90%	588.6	2204
Fri	Friday, June 04, 2004	PM	20	5	5					
Thu	Thursday, June 10, 2004	AM	20	10	15	90%	1295.1	85%	555.9	2178
Thu	Thursday, June 10, 2004	PM	20	55	10					
Mon	Monday, June 21, 2004	AM	20	5	10	95%	1367.05	90%	588.6	2446
Tue	Tuesday, June 22, 2004	PM	20	10	85					
Thu	Thursday, June 24, 2004	AM	20	5	20	95%	1367.05	80%	523.2	2217
Fri	Friday, June 25, 2004	PM	20	45	2					
Sat	Saturday, July 10, 2004	PM	20	4	2					
Mon	Monday, July 19, 2004	AM	20	2	5	98%	1410.22	95%	621.3	2522
Thu	Thursday, July 22, 2004	PM	20	7	10					
Fri	Friday, July 30, 2004	PM	20	10	5					
Thu	Thursday, August 26, 2004	PM	20	25	3					
Fri	Friday, August 27, 2004	PM	20	5	10					
Fri	Friday, September 24, 2004	AM	20	5	10	95%	1367.05	90%	588.6	2348
Fri	Friday, September 24, 2004	PM	20	30	3					
Mon	Monday, October 04, 2004	AM	20	3	5					
Tue	Tuesday, October 05, 2004	PM	20	10	100	97%	1395.83	0%	0	1919
Wed	Wednesday, October 06, 2004	AM	20	10	10	90%	1295.1	90%	588.6	2276
Mon	Monday, October 18, 2004	AM	20	7	10	93%	1338.27	90%	588.6	2319
Sat	Saturday, October 30, 2004	AM	20	7	5					
Mon	Monday, November 01, 2004	AM	20	7	8	93%	1338.27	92%	601.68	2234
Thu	Thursday, November 11, 2004	PM	20	45	5					
Wed	Wednesday, December 01, 2004	AM	20	5	12	95%	1367.05	88%	575.52	2204
Thu	Thursday, December 02, 2004	AM	20	10	10	90%	1295.1	90%	588.6	1916
Wed	Wednesday, December 31, 2003	AM	18	10	5	90%	1295.1	95%	621.3	2407
Tue	Tuesday, November 18, 2003	PM	15	98	50					
Mon	Monday, November 24, 2003	AM	15	2	20	98%	1410.22	80%	523.2	2424
Wed	Wednesday, December 03, 2003	AM	15	10	20	90%	1295.1	80%	523.2	2113
Sun	Sunday, December 07, 2003	PM	15	60	50					
Tue	Tuesday, January 13, 2004	AM	15	4	10	96%	1381.44	90%	588.6	2461
Thu	Thursday, January 22, 2004	AM	15	20	15	80%	1151.2	85%	555.9	2296
Mon	Monday, January 26, 2004	PM	15	70	20					
Wed	Wednesday, February 04, 2004	AM	15	5	7	95%	1367.05	93%	608.22	2466
Mon	Monday, February 09, 2004	AM	15	2	10	98%	1410.22	90%	588.6	2359
Fri	Friday, February 13, 2004	AM	15	10	25	90%	1295.1	75%	490.5	2309
Fri	Friday, February 13, 2004	PM	15	65	5					

Seattle Center Parking Utilization

Percent Full						Weekday Available Spaces in Other Seattle Center Parking Facilities				
Day	Date	Shift	Fifth Ave % Full	MSG % Full	1st N % Full	MSG	total spaces 1439	1st Ave N	total spaces 654	Total Spaces Available
Fri	Friday, February 20, 2004	PM	15	5	10					
Tue	Tuesday, March 02, 2004	AM	15	15	80	85%	1223.15	20%	130.8	1485
Wed	Wednesday, March 10, 2004	PM	15	40	5					
Thu	Thursday, March 11, 2004	AM	15	10	10	90%	1295.1	90%	588.6	2211
Sat	Saturday, March 20, 2004	PM	15	35	1					
Mon	Monday, March 29, 2004	AM	15	20	20	80%	1151.2	80%	523.2	2263
Mon	Monday, April 12, 2004	AM	15	5	10	95%	1367.05	90%	588.6	2283
Thu	Thursday, April 22, 2004	PM	15	65	20					
Fri	Friday, April 30, 2004	PM	15	10	5					
Thu	Thursday, May 06, 2004	AM	15	10	10	90%	1295.1	90%	588.6	2145
Fri	Friday, May 07, 2004	AM	15	10	15	90%	1295.1	85%	555.9	2113
Fri	Friday, May 14, 2004	PM	15	35	5					
Sun	Sunday, June 27, 2004	AM	15	1	1					
Wed	Wednesday, August 18, 2004	PM	15	65	5					
Fri	Friday, August 20, 2004	PM	15	10	5					
Thu	Thursday, September 09, 2004	AM	15	10	5	90%	1295.1	95%	621.3	2145
Sat	Saturday, September 11, 2004	PM	15	3	5					
Fri	Friday, September 17, 2004	AM	15	3	10	97%	1395.83	90%	588.6	2475
Fri	Friday, September 17, 2004	PM	15	10	5					
Mon	Monday, September 20, 2004	AM	15	4	8	96%	1381.44	92%	601.68	2506
Tue	Tuesday, September 21, 2004	AM	15	3	10	97%	1395.83	90%	588.6	2573
Wed	Wednesday, September 22, 2004	AM	15	5	5	95%	1367.05	95%	621.3	2315
Thu	Thursday, September 23, 2004	AM	15	5	5	95%	1367.05	95%	621.3	2315
Mon	Monday, September 27, 2004	AM	15	5	10	95%	1367.05	90%	588.6	2544
Thu	Thursday, September 30, 2004	AM	15	5	10	95%	1367.05	90%	588.6	2544
Thu	Thursday, September 30, 2004	PM	15	20	5					
Tue	Tuesday, October 05, 2004	AM	15	5	5	95%	1367.05	95%	621.3	2381
Fri	Friday, October 15, 2004	PM	15	10	30	90%	1295.1	70%	457.8	2243
Tue	Tuesday, October 19, 2004	AM	15	20	10	80%	1151.2	90%	588.6	2001
Wed	Wednesday, October 20, 2004	AM	15	5	20	95%	1367.05	80%	523.2	2250
Thu	Thursday, October 21, 2004	AM	15	10	10	90%	1295.1	90%	588.6	2145
Fri	Friday, October 22, 2004	AM	15	5	10	95%	1367.05	90%	588.6	2512
Tue	Tuesday, October 26, 2004	AM	15	5	10	95%	1367.05	90%	588.6	2217
Tue	Tuesday, October 26, 2004	PM	15	35	3					
Wed	Wednesday, October 27, 2004	AM	15	5	10	95%	1367.05	90%	588.6	2217
Wed	Wednesday, October 27, 2004	PM	15	50	5					
Thu	Thursday, October 28, 2004	AM	15	15	20	90%	1295.1	80%	523.2	2047
Fri	Friday, October 29, 2004	AM	15	10	5	90%	1295.1	95%	621.3	2178
Tue	Tuesday, November 16, 2004	AM	15	5	10	95%	1367.05	90%	588.6	2315
Thu	Thursday, November 18, 2004	PM	15	40	10					
Wed	Wednesday, November 24, 2004	PM	15	15	35					
Sat	Saturday, March 27, 2004	PM	12	25	10					
Mon	Monday, May 03, 2004	AM	11	5	5	95%	1367.05	95%	621.3	2479
Mon	Monday, November 17, 2003	PM	10	15	25					
Mon	Monday, December 08, 2003	AM	10	5	8	95%	1367.05	92%	601.68	2590
Wed	Wednesday, December 10, 2003	AM	10	5	5	95%	1367.05	95%	621.3	2217
Sun	Sunday, December 14, 2003	PM	10	50	5					



Seattle Center Parking Utilization

Percent Full						Weekday Available Spaces in Other Seattle Center Parking Facilities				
Day	Date	Shift	Fifth Ave % Full	MSG % Full	1st N % Full	MSG	total spaces 1439	1st Ave N	total spaces 654	Total Spaces Available
Tue	Tuesday, December 16, 2003	AM	10	5	5	95%	1367.05	95%	621.3	2512
Wed	Wednesday, December 17, 2003	AM	10	2	3	98%	1410.22	97%	634.38	2535
Fri	Friday, January 09, 2004	AM	10	5	10	95%	1367.05	90%	588.6	2479
Sun	Sunday, January 18, 2004	PM	10	5	7					
Wed	Wednesday, January 21, 2004	AM	10	80	10	20%	287.8	90%	588.6	1498
Tue	Tuesday, January 27, 2004	AM	10	10	5	90%	1295.1	95%	621.3	2309
Sat	Saturday, February 07, 2004	PM	10	40	5					
Wed	Wednesday, February 25, 2004	AM	10	5	20	95%	1367.05	80%	523.2	2348
Thu	Thursday, February 26, 2004	AM	10	10	20	90%	1295.1	80%	523.2	2276
Wed	Wednesday, March 17, 2004	PM	10	20	5					
Tue	Tuesday, March 30, 2004	AM	10	100	10	0%	0	90%	588.6	916
Thu	Thursday, April 01, 2004	PM	10	35	10					
Sun	Sunday, April 11, 2004	AM	10	1	2					
Sat	Saturday, April 17, 2004	PM	10	75	2					
Wed	Wednesday, April 21, 2004	PM	10	20	10					
Thu	Thursday, May 13, 2004	AM	10	5	10	95%	1367.05	90%	588.6	2479
Tue	Tuesday, May 18, 2004	PM	10	25	5					
Wed	Wednesday, May 19, 2004	PM	10	40	5					
Thu	Thursday, May 20, 2004	PM	10	5	65					
Fri	Friday, May 21, 2004	PM	10	30	25					
Tue	Tuesday, May 25, 2004	AM	10	8	15	92%	1323.88	85%	555.9	2207
Thu	Thursday, June 03, 2004	AM	10	5	10	95%	1367.05	90%	588.6	2446
Fri	Friday, June 04, 2004	AM	10	5	10	95%	1367.05	90%	588.6	2446
Mon	Monday, June 07, 2004	AM	10	5	5	95%	1367.05	95%	621.3	2446
Tue	Tuesday, June 08, 2004	PM	10	5	5					
Mon	Monday, June 14, 2004	PM	10	20	5					
Mon	Monday, July 12, 2004	PM	10	4	80					
Fri	Friday, September 10, 2004	PM	10	4	5					
Wed	Wednesday, September 15, 2004	PM	10	15	90					
Thu	Thursday, September 16, 2004	AM	10	4	10	96%	1381.44	90%	588.6	2493
Thu	Thursday, September 23, 2004	PM	10	15	2					
Wed	Wednesday, September 29, 2004	AM	10	5	8	95%	1367.05	92%	601.68	2557
Fri	Friday, October 01, 2004	AM	10	5	5	95%	1367.05	95%	621.3	2544
Mon	Monday, October 04, 2004	PM	10	10	5					
Fri	Friday, October 08, 2004	PM	10	5	5					
Mon	Monday, October 11, 2004	AM	10	5	10	95%	1367.05	90%	588.6	2557
Wed	Wednesday, October 13, 2004	AM	10	5	5	95%	1367.05	95%	621.3	2577
Wed	Wednesday, October 13, 2004	PM	10	40	5					
Thu	Thursday, October 14, 2004	PM	10	20	5					
Fri	Friday, October 15, 2004	AM	10	5	10	95%	1367.05	90%	588.6	2512
Wed	Wednesday, October 20, 2004	PM	10	45	5					
Mon	Monday, October 25, 2004	AM	10	5	5	95%	1367.05	95%	621.3	2544
Wed	Wednesday, November 03, 2004	AM	10	10	10	90%	1295.1	90%	588.6	2440
Thu	Thursday, November 04, 2004	PM	10	10	8					
Tue	Tuesday, November 09, 2004	PM	10	25	5					
Mon	Monday, November 15, 2004	AM	10	5	10	95%	1367.05	90%	588.6	2544
Mon	Monday, November 22, 2004	AM	10	5	5	95%	1367.05	95%	621.3	2577
Wed	Wednesday, November 24, 2004	AM	10	8	10	92%	1323.88	90%	588.6	2043

Seattle Center Parking Utilization

Percent Full						Weekday Available Spaces in Other Seattle Center Parking Facilities				
Day	Date	Shift	Fifth Ave % Full	MSG % Full	1st N % Full	total spaces		total spaces		Total Spaces Available
						MSG	1439	1st Ave N	654	
Wed	Wednesday, January 14, 2004	AM	9	5	7	95%	1367.05	93%	608.22	2270
Tue	Tuesday, February 24, 2004	AM	9	7	15	93%	1338.27	85%	555.9	2385
Mon	Monday, January 12, 2004	AM	8	5	7	95%	1367.05	93%	608.22	2531
Wed	Wednesday, March 10, 2004	AM	8	5	15	95%	1367.05	85%	555.9	2283
Tue	Tuesday, March 02, 2004	PM	6	4	3					
Thu	Thursday, November 20, 2003	AM	5	5	5	95%	1367.05	95%	621.3	2446
Tue	Tuesday, December 09, 2003	AM	5	5	5	95%	1367.05	95%	621.3	2577
Thu	Thursday, December 11, 2003	AM	5	15	5	85%	1223.15	95%	621.3	2073
Thu	Thursday, December 18, 2003	AM	5	5	5	95%	1367.05	95%	621.3	2512
Wed	Wednesday, January 14, 2004	PM	5	80	5					
Wed	Wednesday, January 21, 2004	AM	5	3	4	97%	1395.83	96%	627.84	2638
Sun	Sunday, February 01, 2004	PM	5	25	25					
Tue	Tuesday, February 24, 2004	PM	5	5	10					
Fri	Friday, March 12, 2004	AM	5	5	5	95%	1367.05	95%	621.3	2603
Mon	Monday, April 05, 2004	PM	5	60	2					
Tue	Tuesday, April 20, 2004	PM	5	5	5					
Wed	Wednesday, May 05, 2004	AM	5	10	10	90%	1295.1	90%	588.6	2407
Tue	Tuesday, May 25, 2004	PM	5	10	5					
Mon	Monday, August 09, 2004	PM	5	40	1					
Thu	Thursday, October 14, 2004	AM	5	5	5	95%	1367.05	95%	621.3	2577
Tue	Tuesday, November 02, 2004	AM	5	5	5	95%	1367.05	95%	621.3	2603
Sat	Saturday, January 03, 2004	PM	3	5	3					
Mon	Monday, March 01, 2004	PM	2	2	15					
Sun	Sunday, December 07, 2003	AM	1	1	1					
Sat	Saturday, January 03, 2004	AM	1	1	1					
Sun	Sunday, February 01, 2004	AM	1	1	1					
Sun	Sunday, February 22, 2004	AM	1	1	1					
Mon	Monday, February 23, 2004	AM	1	1	1	99%	1424.61	99%	647.46	2720
Fri	Friday, April 23, 2004	AM	1	1	2	99%	1424.61	98%	640.92	2196
Thu	Thursday, November 20, 2003	PM	0.5	0.5	0.25					
						average available	1263.722	average available	529.6492	2114
						average used	175.2782	average used	124.3508	

**Appendix C – Visitor Learning Center and Retail**

**Trip Generation  
LOS Worksheets  
Parking Demand**

**C-1**  
**Retail Trip Generation**

## Trip Generation Worksheet - Gates Foundation Retail

### Proposed Uses Person Trips

Land Use	Size	Trip Rate	Inbound %	ITE Veh Trips	Person Trips
Specialty Retail (LU 814)	10,000 sfgfa				AVO = 1.2
Daily		40.670 trips/1,000 sq. ft.	50%	405	485
AM Peak Hour		3.370 trips/1,000 sq. ft.*	48%	35	40
PM Peak Hour		2.590 trips/1,000 sq. ft.	43%	25	30

\* Estimated AM Peak Rate by ratio of PM Generator to PM Adj Street traffic, applied to AM Generator

## Gates Foundation Retail

### Net New Person Trips by Mode of Travel

Trip Generation Summary	Percent of Peak Hour	Percent of Daily	Daily Person Trips	AM Peak Hour			PM Peak Hour		
				In	Out	Total	In	Out	Total
Retail									
Non-Motorized	65%	65%	315	10	15	25	10	10	20
Transit Trips	5%	5%	25	0	0	0	0	0	0
Person Trips by Vehicle	<u>30%</u>	<u>30%</u>	<u>145</u>	<u>10</u>	<u>5</u>	<u>15</u>	<u>5</u>	<u>5</u>	<u>10</u>
Total	100%	100%	485	20	20	40	15	15	30
Total Project Person Trips									
Non-Motorized			315	10	15	25	10	10	20
Transit Trips			25	0	0	0	0	0	0
Person Trips by Vehicle			<u>145</u>	<u>10</u>	<u>5</u>	<u>15</u>	<u>5</u>	<u>5</u>	<u>10</u>
Total			485	20	20	40	15	15	30

*Trip Generation rates were obtained from Trip Generation (ITE, 6th Edition, 1997)*

### Net New Vehicle Trip Generation

Land Use	AVO <sup>1</sup>		Daily Vehicle Trips	AM Peak Hour Vehicle Trips			PM Peak Hour Vehicle Trips		
				In	Out	Total	In	Out	Total
Retail	1.20		120	10	5	15	5	5	10
Total			120	10	5	15	5	5	10

## Gates Foundation Retail

### Total Person Trips by Mode of Travel

Trip Generation Summary	Percent of Peak Hour	Percent of Daily	Daily Person Trips	AM Peak Hour			PM Peak Hour		
				In	Out	Total	In	Out	Total
Retail									
Non-Motorized	65%	65%	315	10	15	25	10	10	20
Transit Trips	5%	5%	25	0	0	0	0	0	0
Person Trips by Vehicle	<u>30%</u>	<u>30%</u>	<u>145</u>	<u>10</u>	<u>5</u>	<u>15</u>	<u>5</u>	<u>5</u>	<u>10</u>
Total	100%	100%	485	20	20	40	15	15	30
Total Project Person Trips									
Non-Motorized			315	10	15	25	10	10	20
Transit Trips			25	0	0	0	0	0	0
Person Trips by Vehicle			<u>145</u>	<u>10</u>	<u>5</u>	<u>15</u>	<u>5</u>	<u>5</u>	<u>10</u>
Total			485	20	20	40	15	15	30

*Trip Generation rates were obtained from Trip Generation (ITE, 6th Edition, 1997)*

### Total Vehicle Trip Generation

Land Use	AVO <sup>1</sup>		Daily Vehicle Trips	AM Peak Hour Vehicle Trips			PM Peak Hour Vehicle Trips		
				In	Out	Total	In	Out	Total
Retail	1.20		120	10	5	15	5	5	10
Total			120	10	5	15	5	5	10



**C-2**  
**LOS Worksheets**

HCM Signalized Intersection Capacity Analysis 2010 With-Project Conditions - PM Peak Hour  
6: Mercer St & 5th Ave 500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↔↔	↔					↔↔	↔	↔	↔↔	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	11	12	12	12	12	11	11	11	11	12
Total Lost time (s)		3.0	3.0					3.0	3.0	3.0	3.0	
Lane Util. Factor		0.86	1.00					0.91	0.91	0.91	0.91	
Frpb, ped/bikes		1.00	0.92					1.00	0.95	1.00	1.00	
Flpb, ped/bikes		1.00	1.00					1.00	1.00	1.00	1.00	
Frt		1.00	0.85					1.00	0.85	1.00	1.00	
Flt Protected		1.00	1.00					1.00	1.00	0.95	0.99	
Satd. Flow (prot)		5874	1421					3190	1335	1527	2843	
Flt Permitted		1.00	1.00					1.00	1.00	0.12	0.70	
Satd. Flow (perm)		5874	1421					3190	1335	201	2004	
Volume (vph)	60	1232	166	0	0	0	0	998	400	116	152	0
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	64	1311	177	0	0	0	0	1062	426	123	162	0
RTOR Reduction (vph)	0	0	60	0	0	0	0	0	172	0	0	0
Lane Group Flow (vph)	0	1375	117	0	0	0	0	1062	254	62	223	0
Confl. Peds. (#/hr)	30		35	35		30	95		25	25		95
Heavy Vehicles (%)	1%	1%	1%	0%	0%	0%	1%	1%	1%	4%	4%	4%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	18	0	0	18	0
Parking (#/hr)	25	25										8
Turn Type	Perm		Perm					Perm	pm+pt			
Protected Phases		2						8		7	4	
Permitted Phases	2		2						8	4		
Actuated Green, G (s)		22.0	22.0					26.0	26.0	46.0	46.0	
Effective Green, g (s)		25.0	25.0					29.0	29.0	49.0	49.0	
Actuated g/C Ratio		0.31	0.31					0.36	0.36	0.61	0.61	
Clearance Time (s)		6.0	6.0					6.0	6.0	6.0	6.0	
Lane Grp Cap (vph)		1836	444					1156	484	405	1406	
v/s Ratio Prot								c0.33		0.03	c0.03	
v/s Ratio Perm		0.23	0.08						0.19	0.06	0.06	
v/c Ratio		0.75	0.26					0.92	0.52	0.15	0.16	
Uniform Delay, d1		24.7	20.6					24.4	20.1	19.1	6.7	
Progression Factor		0.74	0.47					1.08	1.14	2.56	2.80	
Incremental Delay, d2		2.1	1.0					12.1	3.7	0.7	0.2	
Delay (s)		20.2	10.7					38.3	26.5	49.6	18.8	
Level of Service		C	B					D	C	D	B	
Approach Delay (s)		19.1			0.0			34.9			25.5	
Approach LOS		B			A			C			C	
<b>Intersection Summary</b>												
HCM Average Control Delay			26.8			HCM Level of Service			C			
HCM Volume to Capacity ratio			0.65									
Actuated Cycle Length (s)			80.0			Sum of lost time (s)			6.0			
Intersection Capacity Utilization			75.0%			ICU Level of Service			D			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis 2010 With-Project Conditions - PM Peak Hour  
11: Republican St & 5th Ave 500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↔↔	↔		↔↔	↔	↔↔	↔↔	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	11	11	11	11	11	12	11	12
Total Lost time (s)					3.0	3.0	3.0	3.0		3.0	3.0	
Lane Util. Factor					0.95	0.95	1.00	0.91		1.00	0.95	
Frpb, ped/bikes					1.00	0.98	1.00	1.00		1.00	0.99	
Flpb, ped/bikes					0.98	1.00	0.86	1.00		1.00	1.00	
Frt					1.00	0.85	1.00	1.00		1.00	1.00	
Flt Protected					0.95	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)					1624	1448	1471	4889		1672	3314	
Flt Permitted					0.95	1.00	0.54	1.00		0.14	1.00	
Satd. Flow (perm)					1624	1448	834	4889		253	3314	
Volume (vph)	0	0	0	240	5	114	20	1296	36	13	315	10
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	0	0	0	258	5	123	22	1394	39	14	339	11
RTOR Reduction (vph)	0	0	0	0	0	16	0	3	0	0	2	0
Lane Group Flow (vph)	0	0	0	0	263	107	22	1430	0	14	348	0
Confl. Peds. (#/hr)	10			20	20		10	75		20	20	75
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	2%	2%	2%	4%	4%	4%
Parking (#/hr)				8								
Turn Type				Perm		Perm	Perm			Perm		
Protected Phases					2							
Permitted Phases				2		2	1			1		
Actuated Green, G (s)					20.9	20.9	48.1	48.1		48.1	48.1	
Effective Green, g (s)					22.9	22.9	51.1	51.1		51.1	51.1	
Actuated g/C Ratio					0.29	0.29	0.64	0.64		0.64	0.64	
Clearance Time (s)					5.0	5.0	6.0	6.0		6.0	6.0	
Vehicle Extension (s)					3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)					465	414	533	3123		162	2117	
v/s Ratio Prot								c0.29			0.10	
v/s Ratio Perm					0.16	0.07	0.03			0.06		
v/c Ratio					0.57	0.26	0.04	0.46		0.09	0.16	
Uniform Delay, d1					24.3	22.0	5.4	7.4		5.5	5.8	
Progression Factor					1.00	1.00	1.21	1.20		0.59	0.60	
Incremental Delay, d2					1.6	0.3	0.1	0.3		1.0	0.2	
Delay (s)					25.9	22.3	6.6	9.2		4.3	3.7	
Level of Service					C	C	A	A		A	A	
Approach Delay (s)				0.0		24.8		9.1			3.7	
Approach LOS				A		C		A			A	
<b>Intersection Summary</b>												
HCM Average Control Delay				11.0			HCM Level of Service			B		
HCM Volume to Capacity ratio				0.49								
Actuated Cycle Length (s)				80.0			Sum of lost time (s)			6.0		
Intersection Capacity Utilization				55.2%			ICU Level of Service			B		
Analysis Period (min)				15								
c Critical Lane Group												





















HCM Signalized Intersection Capacity Analysis 2010 With-Project Conditions - PM Peak Hour  
12: Harrison St & 5th Ave 500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱	↱	↰	↱		↰	↱	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	11	11	11	11	12	12	11	12
Total Lost time (s)	3.0	3.0			3.0	3.0	3.0	3.0			3.0	
Lane Util. Factor	1.00	1.00			1.00	0.88	1.00	0.95			0.95	
Frpb, ped/bikes	1.00	0.84			1.00	1.00	1.00	0.99			0.99	
Flpb, ped/bikes	1.00	1.00			1.00	1.00	0.85	1.00			1.00	
Flt Protected	0.95	1.00			0.97	1.00	0.95	1.00			1.00	
Satd. Flow (prot)	1517	1141			1774	2748	1433	3319			3314	
Flt Permitted	0.24	1.00			0.97	1.00	0.27	1.00			0.95	
Satd. Flow (perm)	376	1141			1774	2748	410	3319			3146	
Volume (vph)	15	0	25	25	10	747	25	590	15	5	530	10
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	16	0	27	27	11	821	27	648	16	5	582	11
RTOR Reduction (vph)	0	21	0	0	0	0	0	2	0	0	1	0
Lane Group Flow (vph)	16	6	0	0	38	821	27	662	0	0	597	0
Confl. Peds. (#/hr)	100		100	100			185		115	115		185
Heavy Vehicles (%)	19%	19%	19%	0%	0%	0%	4%	4%	4%	4%	4%	4%
Turn Type	Perm			Split		Prot	Perm			Perm		
Protected Phases		2		6	6	6		4			8	
Permitted Phases	2						4			8		
Actuated Green, G (s)	16.0	16.0			26.7	26.7	21.3	21.3			21.3	
Effective Green, g (s)	17.0	17.0			29.7	29.7	24.3	24.3			24.3	
Actuated g/C Ratio	0.21	0.21			0.37	0.37	0.30	0.30			0.30	
Clearance Time (s)	4.0	4.0			6.0	6.0	6.0	6.0			6.0	
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)	80	242			659	1020	125	1008			956	
v/s Ratio Prot		0.01			0.02	c0.30		c0.20				
v/s Ratio Perm	c0.04						0.07				0.19	
v/c Ratio	0.20	0.02			0.06	0.80	0.22	0.66			0.62	
Uniform Delay, d1	25.9	24.9			16.2	22.6	20.8	24.2			23.9	
Progression Factor	1.00	1.00			1.00	1.00	1.47	1.38			1.08	
Incremental Delay, d2	1.2	0.0			0.0	4.7	3.5	3.0			2.9	
Delay (s)	27.1	25.0			16.2	27.3	34.0	36.3			28.7	
Level of Service	C	C			B	C	C	D			C	
Approach Delay (s)		25.8				26.8		36.3			28.7	
Approach LOS		C				C		D			C	
<b>Intersection Summary</b>												
HCM Average Control Delay		30.3				HCM Level of Service				C		
HCM Volume to Capacity ratio		0.61										
Actuated Cycle Length (s)		80.0				Sum of lost time (s)		9.0				
Intersection Capacity Utilization		66.2%				ICU Level of Service		C				
Analysis Period (min)		15										
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis 2010 With-Project Conditions - PM Peak Hour  
13: Harrison St & Broad St 500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations			↱					↱			↱	↱
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	0	5	0	0	0	0	695	15	0	945	726
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	0	0	5	0	0	0	0	716	15	0	974	748
Pedestrians		20										
Lane Width (ft)		11.0										
Walking Speed (ft/s)		4.0										
Percent Blockage		2										
Right turn flare (veh)												
Median type		None			None							
Median storage veh												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1727	2100	881	1211	2467	366	1743			732		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1727	2100	881	1211	2467	366	1743			732		
tC, single (s)	7.5	6.5	6.9	7.6	6.6	7.0	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.6	4.0	3.4	2.2			2.2		
p0 queue free %	100	100	98	100	100	100	100			100		
cM capacity (veh/h)	57	52	289	131	28	622	356			875		
<b>Direction, Lane #</b>												
Volume Total	5	478	254	649	1073							
Volume Left	0	0	0	0	0							
Volume Right	5	0	15	0	748							
cSH	289	1700	1700	1700	1700							
Volume to Capacity	0.02	0.28	0.15	0.38	0.63							
Queue Length 95th (ft)	1	0	0	0	0							
Control Delay (s)	17.7	0.0	0.0	0.0	0.0							
Lane LOS	C											
Approach Delay (s)	17.7	0.0		0.0								
Approach LOS	C											
<b>Intersection Summary</b>												
Average Delay		0.0										
Intersection Capacity Utilization		60.2%			ICU Level of Service					B		
Analysis Period (min)		15										

HCM Signalized Intersection Capacity Analysis 2010 With-Project Conditions - PM Peak Hour  
14: 5th Ave & Broad St 500 Fifth Avenue North

												
Movement	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	12	12	11	11	11	11	12	11	11	12
Total Lost time (s)		3.0			3.0	3.0	3.0	3.0		3.0	3.0	
Lane Util. Factor		0.95			0.95	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes		0.99			1.00	0.85	1.00	1.00		1.00	0.99	
Flpb, ped/bikes		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Frt		0.98			1.00	0.85	1.00	1.00		1.00	1.00	
Flt Protected		1.00			1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		3225			3331	1318	1694	3388		1646	3257	
Flt Permitted		1.00			1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)		3225			3331	1318	1694	3388		1646	3257	
Volume (vph)	0	420	50	0	452	118	185	560	0	125	660	20
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	0	452	54	0	486	127	199	602	0	134	710	22
RTOR Reduction (vph)	0	11	0	0	0	0	0	0	0	0	3	0
Lane Group Flow (vph)	0	495	0	0	486	127	199	602	0	134	729	0
Confl. Peds. (#/hr)	115		85	85		115	130		45	45		130
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	3%	3%	3%	6%	6%	6%
Bus Blockages (#/hr)	0	20	0	0	18	0	0	0	0	0	0	0
Turn Type					Perm	Prot				Prot		
Protected Phases		8			4		5	2		1		6
Permitted Phases						4						
Actuated Green, G (s)		21.0			21.0	21.0	14.0	24.0		14.0	24.0	
Effective Green, g (s)		27.0			27.0	27.0	17.0	27.0		17.0	27.0	
Actuated g/C Ratio		0.34			0.34	0.34	0.21	0.34		0.21	0.34	
Clearance Time (s)		9.0			9.0	9.0	6.0	6.0		6.0	6.0	
Lane Grp Cap (vph)		1088			1124	445	360	1143		350	1099	
v/s Ratio Prot		c0.15			0.15		c0.12	0.18		0.08	c0.22	
v/s Ratio Perm						0.10						
v/c Ratio		0.45			0.43	0.29	0.55	0.53		0.38	0.66	
Uniform Delay, d1		20.7			20.6	19.4	28.1	21.4		27.0	22.6	
Progression Factor		0.91			0.10	0.09	1.23	0.83		1.00	1.00	
Incremental Delay, d2		1.4			1.0	1.3	5.5	1.6		3.2	3.2	
Delay (s)		20.3			3.0	3.1	40.0	19.3		30.2	25.8	
Level of Service		C			A	A	D	B		C	C	
Approach Delay (s)		20.3			3.1		24.4			26.5		
Approach LOS		C			A		C			C		
Intersection Summary												
HCM Average Control Delay		19.6			HCM Level of Service				B			
HCM Volume to Capacity ratio		0.56										
Actuated Cycle Length (s)		80.0			Sum of lost time (s)				9.0			
Intersection Capacity Utilization		56.0%			ICU Level of Service				B			
Analysis Period (min)		15										
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis 2010 With-Project Conditions - PM Peak Hour  
25: Harrison St & Site Access 500 Fifth Avenue North

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑↑			↑
Sign Control	Free	Free			Stop	
Grade	0%	0%			0%	
Volume (veh/h)	0	20	753	26	0	29
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	22	818	28	0	32
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage (veh)						
Upstream signal (ft)		173				
pX, platoon unblocked						
vC, conflicting volume	847				854	287
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	847				854	287
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	96
cM capacity (veh/h)	786				298	710
<b>Direction, Lane #</b>						
Volume Total	22	327	327	192	32	
Volume Left	0	0	0	0	0	
Volume Right	0	0	0	28	32	
cSH	1700	1700	1700	1700	710	
Volume to Capacity	0.01	0.19	0.19	0.11	0.04	
Queue Length 95th (ft)	0	0	0	0	3	
Control Delay (s)	0.0	0.0	0.0	0.0	10.3	
Lane LOS					B	
Approach Delay (s)	0.0	0.0			10.3	
Approach LOS					B	
<b>Intersection Summary</b>						
Average Delay		0.4				
Intersection Capacity Utilization		25.1%			ICU Level of Service	A
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis 2010 With-Project Conditions - PM Peak Hour  
 26: Mercer St & Site Driveway 500 Fifth Avenue North

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↑					↗
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	1740	5	0	0	0	222
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	1933	6	0	0	0	247
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage (veh)						
Upstream signal (ft)	646			646		
pX, platoon unblocked						
vC, conflicting volume			1939		1936	486
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			1939		1936	486
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	53
cM capacity (veh/h)			299		58	527
Direction, Lane #	EB 1	EB 2	EB 3	EB 4	NB 1	
Volume Total	552	552	552	282	247	
Volume Left	0	0	0	0	0	
Volume Right	0	0	0	6	247	
cSH	1700	1700	1700	1700	527	
Volume to Capacity	0.32	0.32	0.32	0.17	0.47	
Queue Length 95th (ft)	0	0	0	0	62	
Control Delay (s)	0.0	0.0	0.0	0.0	17.7	
Lane LOS					C	
Approach Delay (s)	0.0				17.7	
Approach LOS					C	
Intersection Summary						
Average Delay			2.0			
Intersection Capacity Utilization			45.7%		ICU Level of Service	A
Analysis Period (min)			15			

3/21/2006  
6: Mercer St & 5th Ave

500 Fifth Avenue North  
2010 With-Project Conditions - PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑	↑					↑↑	↑	↑	↑↑	↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	11	12	12	12	12	11	11	11	11	12
Total Lost time (s)		3.0	3.0					3.0	3.0	3.0	3.0	
Lane Util. Factor		0.86	1.00					0.91	0.91	0.91	0.91	
Frpb, ped/bikes		1.00	0.92					1.00	0.95	1.00	1.00	
Flpb, ped/bikes		1.00	1.00					1.00	1.00	1.00	1.00	
Frt		1.00	0.85					1.00	0.85	1.00	1.00	
Flt Protected		1.00	1.00					1.00	1.00	0.95	0.99	
Satd. Flow (prot)		5874	1421					3190	1335	1527	2843	
Flt Permitted		1.00	1.00					1.00	1.00	0.12	0.70	
Satd. Flow (perm)		5874	1421					3190	1335	201	2003	
Volume (vph)	60	1232	167	0	0	0	0	1000	407	116	153	0
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	64	1311	178	0	0	0	0	1064	433	123	163	0
RTOR Reduction (vph)	0	0	60	0	0	0	0	0	172	0	0	0
Lane Group Flow (vph)	0	1375	118	0	0	0	0	1064	261	62	224	0
Confl. Peds. (#/hr)	30		35	35		30	95		25	25		95
Heavy Vehicles (%)	1%	1%	1%	0%	0%	0%	1%	1%	1%	4%	4%	4%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	18	0	0	18	0
Parking (#/hr)	25	25										8
Turn Type	Perm		Perm					Perm	pm+pt			
Protected Phases		2						8		7		4
Permitted Phases	2		2						8		4	
Actuated Green, G (s)		22.0	22.0					26.0	26.0	46.0	46.0	
Effective Green, g (s)		25.0	25.0					29.0	29.0	49.0	49.0	
Actuated g/C Ratio		0.31	0.31					0.36	0.36	0.61	0.61	
Clearance Time (s)		6.0	6.0					6.0	6.0	6.0	6.0	
Lane Grp Cap (vph)		1836	444					1156	484	405	1405	
v/s Ratio Prot								c0.33		0.03	c0.03	
v/s Ratio Perm		0.23	0.08						0.20	0.06	0.06	
v/c Ratio		0.75	0.27					0.92	0.54	0.15	0.16	
Uniform Delay, d1		24.7	20.6					24.4	20.2	19.2	6.7	
Progression Factor		0.74	0.47					1.07	1.12	2.54	2.79	
Incremental Delay, d2		2.1	1.1					12.2	3.9	0.7	0.2	
Delay (s)		20.2	10.7					38.3	26.5	49.5	18.8	
Level of Service		C	B					D	C	D	B	
Approach Delay (s)		19.1			0.0			34.9			25.4	
Approach LOS		B			A			C			C	
<b>Intersection Summary</b>												
HCM Average Control Delay			26.8			HCM Level of Service			C			
HCM Volume to Capacity ratio			0.65									
Actuated Cycle Length (s)			80.0			Sum of lost time (s)			6.0			
Intersection Capacity Utilization			75.2%			ICU Level of Service			D			
Analysis Period (min)			15									
c Critical Lane Group												

3/21/2006  
11: Republican St & 5th Ave

500 Fifth Avenue North  
2010 With-Project Conditions - PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↑↑	↑		↑↑	↑	↑↑	↑↑	↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	11	11	11	11	11	12	11	12
Total Lost time (s)					3.0	3.0		3.0	3.0		3.0	3.0
Lane Util. Factor					0.95	0.95		1.00	0.91		1.00	0.95
Frpb, ped/bikes					1.00	0.98		1.00	1.00		1.00	0.99
Flpb, ped/bikes					0.98	1.00		0.86	1.00		1.00	1.00
Frt					1.00	0.85		1.00	1.00		1.00	1.00
Flt Protected					0.95	1.00		0.95	1.00		0.95	1.00
Satd. Flow (prot)					1624	1448		1471	4886		1672	3314
Flt Permitted					0.95	1.00		0.54	1.00		0.14	1.00
Satd. Flow (perm)					1624	1448		834	4886		251	3314
Volume (vph)	0	0	0	246	5	122	20	1297	41	15	315	10
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	0	0	0	265	5	131	22	1395	44	16	339	11
RTOR Reduction (vph)	0	0	0	0	0	16	0	3	0	0	2	0
Lane Group Flow (vph)	0	0	0	0	270	115	22	1436	0	16	348	0
Confl. Peds. (#/hr)	10			20	20		10	75		20	20	75
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	2%	2%	2%	4%	4%	4%
Parking (#/hr)				8								
Turn Type				Perm		Perm	Perm		1		Perm	
Protected Phases					2							1
Permitted Phases				2		2	1				1	
Actuated Green, G (s)					21.0	21.0	48.0	48.0			48.0	48.0
Effective Green, g (s)					23.0	23.0	51.0	51.0			51.0	51.0
Actuated g/C Ratio					0.29	0.29	0.64	0.64			0.64	0.64
Clearance Time (s)					5.0	5.0	6.0	6.0			6.0	6.0
Vehicle Extension (s)					3.0	3.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)					467	416	532	3115		160	2113	
v/s Ratio Prot								c0.29				0.10
v/s Ratio Perm					0.17	0.08	0.03				0.06	
v/c Ratio					0.58	0.28	0.04	0.46			0.10	0.16
Uniform Delay, d1					24.4	22.1	5.4	7.4			5.6	5.9
Progression Factor					1.00	1.00	1.22	1.20			0.60	0.61
Incremental Delay, d2					1.7	0.4	0.1	0.3			1.2	0.2
Delay (s)					26.1	22.4	6.7	9.3			4.6	3.7
Level of Service					C	C	A	A			A	A
Approach Delay (s)		0.0			24.9			9.2			3.8	
Approach LOS		A			C			A			A	
<b>Intersection Summary</b>												
HCM Average Control Delay				11.1						B		
HCM Volume to Capacity ratio				0.50								
Actuated Cycle Length (s)				80.0						6.0		
Intersection Capacity Utilization				55.9%						B		
Analysis Period (min)				15								
c Critical Lane Group												

3/21/2006  
12: Harrison St & 5th Ave

500 Fifth Avenue North  
2010 With-Project Conditions - PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱	↰	↱	↱		↰	↱	↰
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	11	11	11	11	12	12	11	12
Total Lost time (s)	3.0	3.0			3.0	3.0	3.0	3.0			3.0	
Lane Util. Factor	1.00	1.00			1.00	0.88	1.00	0.95			0.95	
Frpb, ped/bikes	1.00	0.84			1.00	1.00	1.00	0.99			0.99	
Flpb, ped/bikes	1.00	1.00			1.00	1.00	0.86	1.00			1.00	
Flt Protected	0.95	1.00			0.97	1.00	0.95	1.00			1.00	
Satd. Flow (prot)	1517	1141			1774	2748	1437	3319			3314	
Flt Permitted	0.24	1.00			0.97	1.00	0.27	1.00			0.95	
Satd. Flow (perm)	376	1141			1774	2748	404	3319			3147	
Volume (vph)	15	0	25	25	10	749	25	594	15	5	536	10
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	16	0	27	27	11	823	27	653	16	5	589	11
RTOR Reduction (vph)	0	21	0	0	0	0	0	2	0	0	1	0
Lane Group Flow (vph)	16	6	0	0	38	823	27	667	0	0	604	0
Confl. Peds. (#/hr)	100		100	100			185		115	115		185
Heavy Vehicles (%)	19%	19%	19%	0%	0%	0%	4%	4%	4%	4%	4%	4%
Turn Type	Perm			Split		Prot	Perm			Perm		
Protected Phases		2		6	6	6		4			8	
Permitted Phases	2						4			8		
Actuated Green, G (s)	16.0	16.0			26.7	26.7	21.3	21.3			21.3	
Effective Green, g (s)	17.0	17.0			29.7	29.7	24.3	24.3			24.3	
Actuated g/C Ratio	0.21	0.21			0.37	0.37	0.30	0.30			0.30	
Clearance Time (s)	4.0	4.0			6.0	6.0	6.0	6.0			6.0	
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)	80	242			659	1020	123	1008			956	
v/s Ratio Prot		0.01			0.02	c0.30		c0.20				
v/s Ratio Perm	c0.04						0.07				0.19	
v/c Ratio	0.20	0.02			0.06	0.81	0.22	0.66			0.63	
Uniform Delay, d1	25.9	24.9			16.2	22.6	20.8	24.3			24.0	
Progression Factor	1.00	1.00			1.00	1.00	1.47	1.38			1.09	
Incremental Delay, d2	1.2	0.0			0.0	4.8	3.6	3.0			3.0	
Delay (s)	27.1	25.0			16.2	27.3	34.2	36.5			29.1	
Level of Service	C	C			B	C	C	D			C	
Approach Delay (s)		25.8				26.8		36.4			29.1	
Approach LOS		C				C		D			C	
<b>Intersection Summary</b>												
HCM Average Control Delay		30.5				HCM Level of Service				C		
HCM Volume to Capacity ratio		0.61										
Actuated Cycle Length (s)		80.0				Sum of lost time (s)		9.0				
Intersection Capacity Utilization		66.4%				ICU Level of Service		C				
Analysis Period (min)		15										
c Critical Lane Group												

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The Transpo Group

Synchro 6 Report  
HCM Signalized Intersection Capacity Analysis

3/21/2006  
13: Harrison St & Broad St

500 Fifth Avenue North  
2010 With-Project Conditions - PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations			↰					↱			↱	↰
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	0	5	0	0	0	0	695	15	0	945	729
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	0	0	5	0	0	0	0	716	15	0	974	752
Pedestrians		20										
Lane Width (ft)		11.0										
Walking Speed (ft/s)		4.0										
Percent Blockage		2										
Right turn flare (veh)												
Median type		None			None							
Median storage veh												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1728	2102	883	1211	2470	366	1746			732		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1728	2102	883	1211	2470	366	1746			732		
tC, single (s)	7.5	6.5	6.9	7.6	6.6	7.0	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.6	4.0	3.4	2.2			2.2		
p0 queue free %	100	100	98	100	100	100	100			100		
cM capacity (veh/h)	56	52	288	131	28	622	355			875		
<b>Direction, Lane #</b>												
Volume Total	5	478	254	649	1076							
Volume Left	0	0	0	0	0							
Volume Right	5	0	15	0	752							
cSH	288	1700	1700	1700	1700							
Volume to Capacity	0.02	0.28	0.15	0.38	0.63							
Queue Length 95th (ft)	1	0	0	0	0							
Control Delay (s)	17.7	0.0	0.0	0.0	0.0							
Lane LOS	C											
Approach Delay (s)	17.7	0.0		0.0								
Approach LOS	C											
<b>Intersection Summary</b>												
Average Delay			0.0									
Intersection Capacity Utilization		60.3%			ICU Level of Service					B		
Analysis Period (min)		15										

M:\05\05050 IRIS\Museum\2010\_With-Project with VLC PM.sy7  
The Transpo Group

Synchro 6 Report  
HCM Unsignalized Intersection Capacity Analysis



3/21/2006  
14: 5th Ave & Broad St

500 Fifth Avenue North  
2010 With-Project Conditions - PM Peak Hour

Movement	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations		↑↑			↑↑	↑		↑↑		↑	↑↑	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	12	12	11	11	11	11	12	11	11	12
Total Lost time (s)		3.0			3.0	3.0		3.0		3.0	3.0	
Lane Util. Factor		0.95			0.95	1.00		1.00		1.00	0.95	
Flpb, ped/bikes		0.99			1.00	0.85		1.00		1.00	0.99	
Flpb, ped/bikes		1.00			1.00	1.00		1.00		1.00	1.00	
Frt		0.98			1.00	0.85		1.00		1.00	1.00	
Flt Protected		1.00			1.00	1.00		0.95		1.00	0.95	
Satd. Flow (prot)		3225			3331	1318		1694		3388	1646	
Flt Permitted		1.00			1.00	1.00		0.95		1.00	0.95	
Satd. Flow (perm)		3225			3331	1318		1694		3388	1646	
Volume (vph)	0	423	50	0	456	120	186	560	0	125	660	20
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	0	455	54	0	490	129	200	602	0	134	710	22
RTOR Reduction (vph)	0	11	0	0	0	0	0	0	0	0	3	0
Lane Group Flow (vph)	0	498	0	0	490	129	200	602	0	134	729	0
Confl. Peds. (#/hr)	115		85	85		115	130		45	45		130
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	3%	3%	3%	6%	6%	6%
Bus Blockages (#/hr)	0	20	0	0	18	0	0	0	0	0	0	0
Turn Type					Perm	Prot				Prot		
Protected Phases		8			4		5	2		1	6	
Permitted Phases						4						
Actuated Green, G (s)		21.0			21.0	21.0	14.0	24.0		14.0	24.0	
Effective Green, g (s)		27.0			27.0	27.0	17.0	27.0		17.0	27.0	
Actuated g/C Ratio		0.34			0.34	0.34	0.21	0.34		0.21	0.34	
Clearance Time (s)		9.0			9.0	9.0	6.0	6.0		6.0	6.0	
Lane Grp Cap (vph)		1088			1124	445	360	1143		350	1099	
v/s Ratio Prot		c0.15			0.15		c0.12	0.18		0.08	c0.22	
v/s Ratio Perm						0.10						
v/c Ratio		0.46			0.44	0.29	0.56	0.53		0.38	0.66	
Uniform Delay, d1		20.8			20.6	19.5	28.1	21.4		27.0	22.6	
Progression Factor		0.92			0.10	0.09	1.23	0.83		1.00	1.00	
Incremental Delay, d2		1.4			1.0	1.3	5.5	1.6		3.2	3.2	
Delay (s)		20.4			3.0	3.1	40.1	19.3		30.2	25.8	
Level of Service		C			A	A	D	B		C	C	
Approach Delay (s)		20.4			3.0			24.5			26.5	
Approach LOS		C			A			C			C	
<b>Intersection Summary</b>												
HCM Average Control Delay		19.6			HCM Level of Service					B		
HCM Volume to Capacity ratio		0.56										
Actuated Cycle Length (s)		80.0			Sum of lost time (s)					9.0		
Intersection Capacity Utilization		56.0%			ICU Level of Service					B		
Analysis Period (min)		15										
c Critical Lane Group												

3/21/2006  
25: Harrison St & Site Access

500 Fifth Avenue North  
2010 With-Project Conditions - PM Peak Hour

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑↑↑			↑
Sign Control	Free	Free		Stop		
Grade	0%	0%		0%		
Volume (veh/h)	0	20	754	29	0	30
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	22	820	32	0	33
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage (veh)						
Upstream signal (ft)		173				
pX, platoon unblocked						
vC, conflicting volume	851				857	289
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	851				857	289
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	95
cM capacity (veh/h)	783				296	708
<b>Direction, Lane #</b>						
Volume Total	22	328	328	195	33	
Volume Left	0	0	0	0	0	
Volume Right	0	0	0	32	33	
cSH	1700	1700	1700	1700	708	
Volume to Capacity	0.01	0.19	0.19	0.11	0.05	
Queue Length 95th (ft)	0	0	0	0	4	
Control Delay (s)	0.0	0.0	0.0	0.0	10.3	
Lane LOS					B	
Approach Delay (s)	0.0	0.0			10.3	
Approach LOS					B	
<b>Intersection Summary</b>						
Average Delay			0.4			
Intersection Capacity Utilization		25.2%		ICU Level of Service		A
Analysis Period (min)		15				

3/21/2006

26: Mercer St &amp; Site Driveway

500 Fifth Avenue North

2010 With-Project Conditions - PM Peak Hour

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↑					↗
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	1747	5	0	0	0	222
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	1941	6	0	0	0	247
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage (veh)						
Upstream signal (ft)	646			646		
pX, platoon unblocked						
vC, conflicting volume			1947		1944	488
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			1947		1944	488
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	53
cM capacity (veh/h)			297		57	526
Direction, Lane #	EB 1	EB 2	EB 3	EB 4	NB 1	
Volume Total	555	555	555	283	247	
Volume Left	0	0	0	0	0	
Volume Right	0	0	0	6	247	
cSH	1700	1700	1700	1700	526	
Volume to Capacity	0.33	0.33	0.33	0.17	0.47	
Queue Length 95th (ft)	0	0	0	0	62	
Control Delay (s)	0.0	0.0	0.0	0.0	17.8	
Lane LOS					C	
Approach Delay (s)	0.0				17.8	
Approach LOS					C	
Intersection Summary						
Average Delay			2.0			
Intersection Capacity Utilization			45.8%		ICU Level of Service	A
Analysis Period (min)			15			

**C-3**  
**Parking Demand**

500 Fifth Ave  
Parking Demand Calculations  
The Transpo Group

## PARKING DEMAND CALCULATIONS With Long-Term TMP

Office Building Area	420,000	
Employee Density - Office	3.29	(employees/1,000 square feet)
<b>EMPLOYEES</b>	<b>1382</b>	

Percent Employees On-Site	85%
<b>EMPLOYEES ON-SITE</b>	<b>1175</b>

### MODE SPLIT - Office

		PEOPLE
Transit	25%	294
Other	5%	59
SOV	50%	588
Carpool	20%	235

### PARKING STALL DEMAND

Office = **420,000**

Vehicles (AVO = 1.0/2.3)	690	
Short-term office parking (0.10 Stalls/1,000 SF)	42	
Subtotal	<u>732</u>	1.74 stalls/1,000 sf

Retail = **10,000**

Customer Parking (0.64 Stalls/1,000 SF)	6	
Employee parking (0.27 Stalls/1,000 SF)	3	
Subtotal	<u>9</u>	0.91 stalls/1,000 sf
Demand at Office Peak (87% of Peak)	8	

VLC = **16,000**

Customer Parking (based on pro-rated SAM data)	6	
Employee parking (based on pro-rated SAM data)	4	
Subtotal	<u>10</u>	0.63 stalls/1,000 sf
Demand at Office Peak (100% of Peak)	10	

<b>TOTAL PARKING DEMAND (STALLS) =</b>	<b>750</b>
--	------------

## **Appendix D – Distribution List**

## Distribution List

<b>Federal Agencies:</b>	Economic Development Administration Environmental Protection Agency, Region X Housing and Urban Development, Region X National Marine Fisheries Service United Indians of All Tribes
<b>State of Washington:</b>	Governor of the State of Washington Department of Community Development – State Historic Preservation Officer Department of Ecology – Environmental Review Section Department of Health Department of Natural Resources Department of Transportation Washington State Trade and Economic Development
<b>Regional Agencies:</b>	Metro Environmental Planning Puget Sound Clean Air Agency Puget Sound Regional Council of Governments
<b>City of Seattle:</b>	City Council Laurie Geissinger, City Light Design Commission Chief, Fire Department Director, Health Department Housing Department Law Department Director, Department of Neighborhoods Director, Parks Department Gordon Clowers, Planning and Development Chief, Police Department SEPA Public Information Center (DPD) Director, Seattle Center Director, Seattle Department of Transportation Urania Perez, Senior Environmental Specialist., Seattle Department of Transportation
<b>King County</b>	Department of Transportation, Metro Transit Division
<b>Libraries:</b>	Seattle Library – Government Publications Seattle Public Library – Queen Anne Branch
<b>Newspapers:</b>	Seattle Times Seattle Post Intelligencer Daily Journal of Commerce

**Special Interest**

**Groups & Individuals:**

Allied Arts of Seattle

League of Women Voters, Land Use Chair



**Appendix E – 600,000 Sq. Ft. Expanded Phase 1 Traffic Analysis**

Traffic and Transportation Technical Report  
600,000 Square Foot Expanded Phase I  
Analysis

500 Fifth Avenue North

Prepared for:  
IRIS Holdings, LLC

June 2006

Prepared by:  
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## Introduction

The purpose of this analysis is to document the traffic conditions within the study area with the development of an Expanded Phase 1, including 600,000 square feet of development. This represents an increase in the level of development identified for the initial phase documented in the Draft Environmental Impact Statement (DEIS)(April 2006), which assumed the construction of 450,000 sq. ft. for the *Alternative 2* initial phase.

The analysis follows the same format that was used to document the impacts associated with the alternatives evaluated in the DEIS, and highlights where new impacts would result from the increased development area identified for the Expanded Phase 1.

As documented in the subsequent sections of this analysis, the additional traffic generated by the Expanded Phase 1 is not anticipated to cause any additional study intersections to degrade to LOS F with the addition of project traffic. However, the addition of project traffic volumes at those intersections which already operate at LOS F with the *Alternative 1* (No Action) initial phase may increase delay during the AM and PM peak hours. In addition, the Expanded Phase 1 would cause one intersection to degrade beyond the levels reported in the DEIS for the *Alternative 2* initial phase. The Stewart Street/Yale Avenue intersection is anticipated to degrade from LOS B to LOS C during the PM peak hour due to the increase in trips generated by the Expanded Phase 1. All other study intersections would continue to operate at the same LOS as reported in the DEIS for the *Alternative 2* initial phase.

## Street System

Relative to the Alternative 1 initial phase (No Action), no off-site modifications to street channelization or intersection control are proposed as part of the Expanded Phase 1. Development associated with the Expanded Phase 1 would improve existing sidewalks on the site frontage along Mercer Street, Harrison Street and 5<sup>th</sup> Avenue N.

## Traffic Generation

The trip generation for the Expanded Phase 1 was calculated using the methodology documented in the DEIS, and is consistent with the analysis of the previously evaluated alternatives. Weekday average daily, AM peak hour, and PM peak hour trip generation by the proposed development were estimated.

As shown in Table 1, the Expanded Phase 1, 600,000 square-feet, would generate approximately 4,850 daily trips. During the weekday AM peak hour, the Expanded Phase 1 would generate approximately 910 trips. During the weekday PM peak hour, the Expanded Phase 1 would generate approximately 855 trips. This represents an increase from the DEIS analysis of 1,215 daily, 230 AM peak hour, and 215 PM peak hour trips. The detailed calculation worksheets are provided in Attachment A.

**Table 1. 2010 Net New Trip Generation – Expanded Phase 1**

Table Heading	Square Footage	Daily	AM Peak Hour			PM Peak Hour		
			In	Out	Total	In	Out	Total
DEIS Analysis – Phase 1	450,000 sf	3,635	635	45	680	65	575	640
<u>Expanded Phase 1</u>	<u>600,000 sf</u>	<u>4,850</u>	<u>845</u>	<u>65</u>	<u>910</u>	<u>85</u>	<u>770</u>	<u>855</u>
Increase	150,000 sf	1,215	210	20	230	20	195	215

## Distribution and Assignment

Traffic associated with the Expanded Phase 1 is expected to distribute to the surrounding local and regional facilities according to the percentages and distribution patterns documented in the DEIS. The assigned project trips for each block are illustrated in Attachment B.

## Traffic Volume Impacts

Peak hour traffic volumes for the Expanded Phase 1 were developed by assigning the project-generated trips to the *Alternative 1* (No Action) initial phase peak hour traffic volumes at the study intersections. The resulting 2010 traffic volumes for the Expanded Phase 1 are illustrated in Attachment C. These volumes were then compared with the *Alternative 1* (No Action) initial phase traffic volumes. Tables 2 and 3 illustrate the percent impact of traffic generated by the Expanded Phase 1 at the study area intersections during weekday AM and PM peak hours.

Relative to the analysis of traffic volume impacts associated with the *Alternative 2* initial phase documented in the DEIS, during both the AM and PM peak hours, traffic volume impacts have increased by less than five percent at study intersections, with the exception of the 5<sup>th</sup> Avenue/Republican Street intersection, where traffic volume impacts during the AM peak hour have increased by 5.9 percent.

Beyond the immediate study area, traffic generated by the Expanded Phase 1 would continue to account for less than ten percent of the total entering traffic during the AM and PM peak hours. The portion of the study area bounded by 5<sup>th</sup> Ave. N., Harrison St., and Mercer St. would experience the greatest traffic impact, ranging from approximately 5 to 31 percent. This is due to their close proximity to the project sites.

During the weekday AM peak hour, the project impact at the most congested intersections range from 0.4 percent (7 trips) at the Howell St./Yale Ave. N. intersection, to 5.7 percent (227 trips) at the intersection of Denny Way/Aurora Ave. Peak hour traffic volumes typically vary on a daily basis and have been documented to fluctuate as high as 5 percent, yet the fluctuation is usually unnoticeable from a driver's perspective.

During the weekday PM peak hour, the project impact at the most congested intersections would be fewer than 5 percent with one exception. The intersection of Dexter Ave/Mercer St would be impacted by 9.6 percent (385 trips).

The percentages identified in Tables 2 and 3 show that the impacts of the Expanded Phase 1 would fall within the range of fluctuation that occurs as a result of background traffic at the majority of study intersections. For those intersections closest to the project sites that have a 5 to 31 percent impact, intersection operations were evaluated to determine whether additional measures would be needed to mitigate impacts of the Expanded Phase 1, as described in the following sections.

**Table 2. 2010 AM Peak Hour Percent Project Impact – Expanded Phase 1**

		Alternative 1	Expanded Phase 1 Project	% Project Impact
	Intersection	(No Action)	Traffic	
1	5 <sup>th</sup> Ave/Roy St	955	48	4.8%
2	9 <sup>th</sup> Ave/Broad St	3,470	338	8.9%
3	Westlake Ave/Valley St	4,255	402	8.6%
4	Fairview Ave/Valley St	4,160	299	6.7%
5	1 <sup>st</sup> Ave/Mercer St	1,550	42	2.6%
6	5 <sup>th</sup> Ave/Mercer St	2,365	119	4.8%
7	Dexter Ave/Mercer St	3,225	32	1.0%
8	9 <sup>th</sup> Ave/Mercer St	3,240	26	0.8%
9	Westlake Ave/Mercer St	3,635	26	0.7%
10	Fairview Ave/Mercer St	7,150	274	3.7%
11	5 <sup>th</sup> Ave/Republican	1,100	502	31.3%
12	5 <sup>th</sup> Ave/Harrison St	1,160	449	27.9%
13	Broad St/Harrison St*	2,240	380	14.5%
14	5 <sup>th</sup> Ave/Broad St	2,145	408	16.0%
15	1 <sup>st</sup> Ave/Denny Way	3,750	45	1.2%
16	Broad St/Denny Way	3,495	133	3.7%
17	5 <sup>th</sup> Ave/Denny Way	2,420	272	10.5%
18	Aurora Ave/Denny Way	3,780	227	5.7%
19	Dexter Ave/Denny Way	2,890	227	7.3%
20	Westlake Ave/Denny Way	2,975	185	5.9%
21	Fairview Ave/Denny Way	3,145	180	5.4%
22	Stewart St/Denny Way	4,470	138	3.0%
23	Stewart St/Yale Ave	2,790	7	0.3%
24	Howell St/Yale Ave	1,785	7	0.4%

**Table 3. 2010 PM Peak Hour Percent Project Impact – Expanded Phase 1**

	Intersection	Alternative 1 (No Action)	Expanded Phase 1 Project Traffic	% Project Impact
1	5 <sup>th</sup> Ave/Roy St	1,305	81	5.8%
2	9 <sup>th</sup> Ave/Broad St	3,755	34	0.9%
3	Westlake Ave/Valley St	4,835	107	2.2%
4	Fairview Ave/Valley St	3,870	68	1.7%
5	1 <sup>st</sup> Ave/Mercer St	2,070	4	0.2%
6	5 <sup>th</sup> Ave/Mercer St	2,995	175	5.5%
7	Dexter Ave/Mercer St	3,605	385	9.6%
8	9 <sup>th</sup> Ave/Mercer St	3,070	308	9.1%
9	Westlake Ave/Mercer St	4,660	308	6.2%
10	Fairview Ave/Mercer St	7,775	257	3.2%
11	5 <sup>th</sup> Ave/Republican	1,660	520	23.9%
12	5 <sup>th</sup> Ave/Harrison St	1,705	389	18.6%
13	Broad St/Harrison St*	2,515	38	1.5%
14	5 <sup>th</sup> Ave/Broad St	2,330	347	13.0%
15	1 <sup>st</sup> Ave/Denny Way	3,930	42	1.1%
16	Broad St/Denny Way	3,555	90	2.5%
17	5 <sup>th</sup> Ave/Denny Way	2,455	218	8.2%
18	Aurora Ave/Denny Way	4,365	176	3.9%
19	Dexter Ave/Denny Way	3,295	176	5.1%
20	Westlake Ave/Denny Way	3,745	172	4.4%
21	Fairview Ave/Denny Way	3,855	133	3.3%
22	Stewart St/Denny Way	3,760	129	3.3%
23	Stewart St/Yale Ave	2,080	77	3.6%
24	Howell St/Yale Ave	2,850	77	2.6%

## Traffic Operations Impacts

Traffic operations impacts were re-evaluated to account for the increased trip generation associated with the Expanded Phase 1. This section also re-evaluates area-wide concurrency based on the City's screenline analysis.

### Intersection Level of Service

Tables 4 and 5 provide a summary of the Expanded Phase 1 weekday AM and PM peak hour levels of service, respectively. For purposes of comparison, *Alternative 1* (No Action) initial phase and DEIS *Alternative 2* initial phase levels of service are also provided. The corresponding LOS worksheets are included in Attachment D.

As shown in Table 4, during the weekday AM peak hour, all study intersections will continue to operate at the same level of service with the Expanded Phase 1 as documented in the DEIS for the *Alternative 2* initial phase. At the majority of study intersections intersection delays are forecast to increase relative to the analysis documented in the DEIS, with



increases ranging from less than a second to almost nine seconds at the Westlake Avenue/Valley Street intersection.

During the weekday PM peak hour, as shown in Table 5, the Expanded Phase 1 would degrade the LOS at one additional intersection when compared with the analysis documented in the DEIS for the *Alternative 2* initial phase. The intersection of Stewart Street/Yale Avenue is anticipated to degrade from LOS B to LOS C as a result of the additional traffic generated by the Expanded Phase 1. At the majority of the remaining study intersections, delays are anticipated to increase by less than 5 seconds relative to the *Alternative 2* initial phase analysis documented in the DEIS.

Five of the signalized study intersections will continue to operate at LOS F with or without the Expanded Phase 1. Project impacts to these locations are summarized below in terms of traffic volume impacts. When an intersection reaches LOS F, vehicle delay calculations are sensitive and may not provide a reliable measure of project impacts.

**#9. Mercer St./Westlake Ave. N.** This intersection would continue to operate at LOS F during the PM peak hour. Project traffic accounts for approximately 6.2 percent of the PM peak hour entering volumes at this intersection. The South Lake Union Transportation Study has identified solutions to address both the existing and future operational deficiencies at this intersection.

**#10. Mercer St./Fairview Ave. N.** This intersection would continue to operate at LOS F with significant vehicle delay during both the AM and PM peak hours. Project traffic accounts for 3.7 percent or less of the peak hour entering traffic volumes at this location. The South Lake Union Transportation Study has identified solutions to address both the existing and future operational deficiencies at this intersection.

**#18. Aurora Ave/Denny Way.** This intersection would continue to operate at LOS F during the PM peak hour. Project traffic accounts for less than 4.0 percent of the PM peak hour entering volumes at this intersection.

**#22. Stewart St./Denny Way.** This intersection would continue to operate at LOS F during the AM peak hour. Project traffic accounts for 3.0 percent of the AM peak hour entering volumes at this intersection. Improvement options are limited due to capacity restraints and the close proximity to the I-5 entrance and exit.

**#24. Howell St./Yale Ave.** This intersection would continue to operate at LOS F during the PM peak hour. Project traffic accounts for 2.6 percent of the PM peak hour entering volumes at this intersection. Improvement options are limited due to capacity restraints and high traffic volumes entering I-5.

In addition to the intersections which are anticipated to operate at LOS F with or without the Expanded Phase 1, three of the signalized study intersections will continue to operate at LOS E with or without the Expanded Phase 1.

**#7. Mercer St./Dexter Ave. N.** This intersection would continue to operate at LOS E during the PM peak hour. Project traffic accounts for 9.6 percent of the PM peak hour entering volumes at this intersection. The South Lake Union Transportation Study has identified solutions to address both the existing and future operational deficiencies at this intersection.

**#21. Fairview Ave./Denny Way.** This intersection would continue to operate at LOS E during the PM peak hour. Project traffic accounts for approximately 3.3 percent of the PM peak hour entering volumes at this intersection.

**#24. Howell St./Yale Ave.** This intersection would continue to operate at LOS E during the AM peak hour. Project traffic accounts for less than 1 percent of the AM peak hour entering volumes at this intersection. Improvement options are limited due to capacity restraints and high traffic volumes entering I-5.

During the AM peak hour, the addition of traffic generated by the Expanded Phase 1 would cause the levels of service at the following intersections to degrade:

- #2. 9<sup>th</sup> Ave/Broad St (LOS C to LOS D)
- #3. Westlake Ave/Valley St (LOS C to LOS D)
- #4. Fairview Ave/Valley St (LOS C to LOS D)
- #18. Aurora Ave/Denny Way (LOS D to LOS E)
- #21. Fairview Ave/Denny Way (LOS C to LOS D)

**#18. Aurora Ave/Denny Way.** This intersection would degrade operations from LOS D to LOS E during the AM peak hour. Average intersection delay at this intersection would increase by approximately 22 seconds as a result of the addition of approximately 227 project trips representing 5.7 percent of total traffic.

The Washington State Department of Transportation (WSDOT) and City of Seattle, as part of the larger Alaskan Way Viaduct replacement solution, are currently evaluating changes to SR 99 through the South Lake Union Neighborhood. The current proposal would lower SR 99 between Roy Street and Denny Way, and would reconnect several streets across SR 99, including Republican Street, Harrison Street, and Thomas Street.

In addition, the connections between SR 99 and the surface street network would be modified to provide additional access points at Roy Street and Republican Street. The Alaskan Way Viaduct project is not anticipated to be complete until beyond 2010, so was not included in the evaluation of project impacts for the Expanded Phase 1. However, when complete, the Alaskan Way Viaduct project could relieve congestion at the Aurora Ave/Denny Way intersection, through the provision of the additional access ramps.

**Table 4. 2010 AM Peak Hour LOS Summary – Expanded Phase 1**

#	Intersection	2010 Alternative 1 (No Action)			2010 Alternative 2 – DEIS Analysis			2010 Expanded Phase 1		
		LOS <sup>1</sup>	Delay <sup>2</sup>	V/C or WM <sup>3,4</sup>	LOS	Delay	V/C or WM	LOS	Delay	V/C or WM
1	5 <sup>th</sup> Ave/Roy St	C	26.5	0.51	C	27.1	0.53	C	27.4	0.54
2	9 <sup>th</sup> Ave/Broad St	C	29.5	0.95	D	44.0	1.03	D	52.9	1.06
3	Westlake Ave/Valley St	C	23.7	0.88	D	41.8	0.95	D	50.3	1.04

4	Fairview Ave/Valley St	C	33.2	0.86	D	35.6	0.91	D	37.5	0.93
5	1 <sup>st</sup> Ave/Mercer St	B	14.2	0.50	B	14.4	0.51	B	14.5	0.52
6	5 <sup>th</sup> Ave/Mercer St	D	43.5	0.45	D	44.8	0.46	D	38.3	0.47
7	Dexter Ave/Mercer St	D	44.1	0.82	D	44.8	0.82	D	45.0	0.82
8	9 <sup>th</sup> Ave/Mercer St	C	27.6	0.76	C	27.5	0.77	C	27.5	0.77
9	Westlake Ave/Mercer St	C	21.7	0.81	C	22.9	0.81	C	21.8	0.81
10	Fairview Ave/Mercer St	F	>120.0	1.25	F	>120.0	1.34	F	>120.0	1.36
11	5 <sup>th</sup> Ave/Republican	A	9.7	0.18	A	7.5	0.28	A	9.8	0.31
12	5 <sup>th</sup> Ave/Harrison St	C	34.2	0.36	C	31.4	0.46	C	30.3	0.50
13	Broad St/Harrison St*	C	19.0	EB	C	22.5	EB	C	23.9	EB
14	5 <sup>th</sup> Ave/Broad St	D	47.6	0.53	D	47.3	0.61	D	47.2	0.65
15	1 <sup>st</sup> Ave/Denny Way	B	14.8	0.81	B	15.6	0.82	B	17.2	0.84
16	Broad St/Denny Way	C	20.4	0.76	C	20.8	0.76	C	21.0	0.76
17	5 <sup>th</sup> Ave/Denny Way	B	13.1	0.60	B	13.7	0.61	B	14.0	0.63
18	Aurora Ave/Denny Way	D	45.3	0.92	E	60.1	0.96	E	67.4	0.98
19	Dexter Ave/Denny Way	B	15.9	0.67	B	17.1	0.69	B	17.4	0.70
20	Westlake Ave/Denny Way	B	14.5	0.68	B	14.6	0.68	B	14.4	0.69
21	Fairview Ave/Denny Way	C	34.7	0.80	D	40.5	0.85	D	44.1	0.87
22	Stewart St/Denny Way	F	90.7	1.14	F	97.3	1.12	F	100.6	1.13
23	Stewart St/Yale Ave	A	5.2	– <sup>5</sup>	A	5.3	– <sup>5</sup>	A	5.3	– <sup>5</sup>
24	Howell St/Yale Ave	E	66.7	1.04	E	68.3	1.05	E	68.9	1.05

1. Level of service, based on 2000 HCM methodology.

2. Average delay per vehicle, in seconds.

3. V/C = Volume-to-capacity ratio for signalized intersections, WM= worst movement/approach for unsignalized intersections.

4. Based on the v/c ratio of greater than 1.20, vehicle delay at this intersection may be greater than reported in the table.

5. Intersection runs on controller at Stewart/Denny; resulting v/c ratio not applicable to this intersection.

\* Unsignalized intersection

**Table 5. 2010 PM Peak Hour LOS Summary – Expanded Phase 1**

#	Intersection	2010 Alternative 1 (No Action)			2010 Alternative 2 – DEIS Analysis			2010 Expanded Phase 1		
		LOS <sup>1</sup>	Delay <sup>2</sup>	V/C or WM <sup>3,4</sup>	LOS	Delay	V/C or WM	LOS	Delay	V/C or WM
1	5 <sup>th</sup> Ave/Roy St	C	20.1	0.66	C	22.7	0.69	C	24.2	0.70
2	9 <sup>th</sup> Ave/Broad St	C	25.4	0.92	C	25.5	0.93	C	26.1	0.93
3	Westlake Ave/Valley St	D	50.6	1.16	E	56.8	1.18	E	61.3	1.19
4	Fairview Ave/Valley St	C	28.9	0.77	C	29.4	0.79	C	29.5	0.79
5	1 <sup>st</sup> Ave/Mercer St	B	19.0	0.63	B	19.0	0.64	B	19.0	0.64
6	5 <sup>th</sup> Ave/Mercer St	C	26.5	0.63	C	26.8	0.65	C	27.9	0.66
7	Dexter Ave/Mercer St	E	68.3	1.04	E	68.1	1.10	E	68.7	1.12
8	9 <sup>th</sup> Ave/Mercer St	C	30.2	0.69	C	30.1	0.73	C	30.1	0.75
9	Westlake Ave/Mercer St	F	106.2	1.09	F	>120.0	1.14	F	>120.0	1.15
10	Fairview Ave/Mercer St	F	>120.0	1.35	F	>120.0	1.39	F	>120.0	1.40
11	5 <sup>th</sup> Ave/Republican	A	3.4	0.31	B	11.0	0.49	B	12.5	0.55

12	5th Ave/Harrison St	C	30.2	0.58	C	30.3	0.61	C	34.7	0.63
13	Broad St/Harrison St*	C	18.0	EB	C	17.7	EB	C	17.8	EB
14	5th Ave/Broad St	C	21.4	0.55	B	19.6	0.56	B	19.3	0.57
15	1st Ave/Denny Way	B	15.9	0.78	B	14.9	0.75	B	16.6	0.76
16	Broad St/Denny Way	C	20.6	0.71	C	21.6	0.73	C	21.7	0.74
17	5th Ave/Denny Way	B	16.0	0.61	C	20.7	0.69	C	25.7	0.73
18	Aurora Ave/Denny Way	F	>120.0	1.13	F	>120.0	1.14	F	>120.0	1.14
19	Dexter Ave/Denny Way	B	16.3	0.80	B	17.6	0.86	B	18.8	0.88
20	Westlake Ave/Denny Way	C	22.0	0.85	C	23.3	0.90	C	23.9	0.91
21	Fairview Ave/Denny Way	E	55.3	0.90	E	56.8	0.89	E	57.6	0.90
22	Stewart St/Denny Way	D	53.7	1.00	E	64.1	1.03	E	68.0	1.04
23	Stewart St/Yale Ave	B	15.5	– <sup>5</sup>	B	19.8	– <sup>5</sup>	C	22.9	– <sup>5</sup>
24	Howell St/Yale Ave	F	>120.0	1.34	F	>120.0	1.39	F	>120.0	1.41

1. Level of service, based on 2000 HCM methodology.

2. Average delay per vehicle, in seconds.

3. V/C = Volume-to-capacity ratio for signalized intersections, WM= worst movement/approach for unsignalized intersections.

4. Based on the v/c ratio of greater than 1.20, vehicle delay at this intersection may be greater than reported in the table.

5. Intersection runs on controller at Stewart/Denny; resulting v/c ratio not applicable to this intersection.

\* Unsignalized intersection

The remaining study intersections would operate at the same level of service as with the *Alternative 1* (No Action) initial phase during the AM peak hour.

During the PM peak hour, the addition of project traffic associated with the Expanded Phase 1 would cause the LOS at the following intersections to degrade:

- #3. Westlake Ave/Valley St (LOS D to LOS E)
- #11. 5<sup>th</sup> Ave/Republican St (LOS A to LOS B)
- #14. 5<sup>th</sup> Ave/Broad St (LOS C to LOS B)
- #17. 5<sup>th</sup> Ave/Denny Way (LOS B to LOS C)
- #22. Stewart St/Denny Way (LOS D to LOS E)
- #23. Stewart St/Yale Ave (LOS B to LOS C)

**#3. Westlake Ave./Valley St.** This intersection is forecast to operate at LOS E in the PM peak hour with the Expanded Phase 1, compared to LOS D with the *Alternative 1* (No Action) initial phase. Average intersection delay at this intersection would increase by approximately 11 seconds as a result of the addition of approximately 107 project trips representing 2.2 percent of total traffic.

**#22. Stewart St./Denny Way.** This intersection is forecast to operate at LOS E in the PM peak hour with the Expanded Phase 1, compared to LOS D with the *Alternative 1* (No Action) initial phase. This intersection serves as the gateway to downtown Seattle from I-5 and currently operates, and will continue to operate at LOS F during the AM peak hour.

The remaining study intersections would operate at the same level of service as with the *Alternative 1* (No Action) initial phase during the PM peak hour.

As Tables 4 and 5 indicate, the addition of project traffic increases delay at the majority of study intersections, which is typical when intersection volumes increase. However at five

study intersections (#6, #9, #12, and #20 during the AM peak hour, #14 during both the AM and PM peak hours) the v/c ratio typically increases while the delay decreases compared to the *Alternative 1* (No Action) initial phase. This is the result of project trips being added to the non-critical movements at these intersections, which in turn results in reduced average vehicle delays for the intersection overall.

## Site Access

Three points of ingress and egress would be provided for the Expanded Phase 1. The configuration of the proposed site access for the Expanded Phase 1 is consistent with the configuration described as part of the analysis presented in the DEIS. A LOS analysis was conducted for each site access intersections for the AM and PM peak hours.

Table 6 summarizes the weekday AM and PM peak hour levels of service for the site access intersections that would serve as access to the Expanded Phase 1. The site access LOS worksheets are included in Attachment D.

**Table 6. 2010 Driveway LOS Summary – Expanded Phase 1**

Intersection	Expanded Phase 1		
	LOS <sup>1</sup>	Delay <sup>2</sup>	V/C or WM <sup>3</sup>
<b>AM Peak Hour</b>			
5th Avenue/Republican St	A	9.8	0.31
South Driveway/Harrison St	B	11.0	SB
North Driveway/Mercer St	B	11.7	NB
<b>PM Peak Hour</b>			
5th Avenue/Republican St	B	12.5	0.55
South Driveway/Harrison St	B	10.4	SB
North Driveway/Mercer St	C	23.0	NB

1. Level of service, based on 2000 HCM methodology.  
 2. Average delay per vehicle, in seconds.  
 3. V/C = Volume-to-capacity ratio for signalized intersections, WM= worst movement/approach for unsignalized intersections.

As shown in Table 6, all three site access intersections are estimated to operate at LOS C or better during both the AM and PM peak hours. The results indicate the site access intersections would provide adequate capacity for the Expanded Phase 1.

In addition to the analysis of the site access intersections, vehicle queuing and individual movement levels of service were examined at the intersections directly adjacent to the site access intersections to determine how they interact with each other. During the AM peak hour the driveway approach at the 5<sup>th</sup> Ave/Republican St intersection would operate at LOS D, but with vehicle queues of approximately three vehicles. The Harrison Street driveway is anticipated to operate at LOS B during the AM peak hour, as shown in Table 6, with minimal vehicle queues on the driveway approach. However, it is anticipated that the westbound right-turn queue from the 5<sup>th</sup> Ave/Harrison St signal would extend beyond the driveway intersection, at times blocking the Harrison St driveway during the AM peak hour.

No blocking issues are anticipated at the 5<sup>th</sup> Ave/Republican St intersection during the AM peak hour.

During the PM peak hour, the driveway approach to the 5<sup>th</sup> Ave/Republican St intersection is anticipated to operate at LOS C, however due to higher PM peak hour outbound traffic volumes, on-site vehicle queues are anticipated to extend for approximately 250 feet. As shown in Table 6, the Harrison Street driveway approach is anticipated to operate at LOS B with minimal vehicle queuing. The westbound queue from the 5<sup>th</sup> Ave/Harrison St intersection is anticipated to block the Harrison Street driveway during the PM peak hour, however, this queue is anticipated to be shorter during the PM peak hour than in the AM peak hour so would block the driveway less frequently and for shorter time periods. No blocking issues are anticipated at the 5<sup>th</sup> Ave/Republican St intersection during the PM peak hour.

## Transportation Concurrency

The City has implemented a Transportation Concurrency Project Review System to comply with one of the requirements of the Washington State Growth Management Act (GMA). The system, as described in DCLU's Director's Rule 4-99<sup>1</sup> and the City's *Land Use and Zoning Code*, is designed to provide a mechanism that would determine whether adequate transportation facilities would be available "concurrent" with proposed development projects.

Five screenlines were chosen for review, based on their location in relationship to the project sites and estimated influence areas. The screenlines that were analyzed for concurrency review include the Magnolia and Ship Canal Bridges and South Lake Union, as shown in Table 7.

**Table 7. 2010 Concurrency Analysis – Expanded Phase 1**

SL <sup>1</sup> Number	Location	Direction <sup>2</sup>	Capacity	1998 Volume	V/C Standard	Expanded Phase 1	
						Project Traffic	V/C
2	Magnolia	EB	4,480	2,130	1.00	8	0.48
		WB	4,480	2,820	1.00	68	0.64
5.12	Fremont Bridge	NB	2,000	2,070	1.20	35	1.05
		SB	2,000	1,270	1.20	3	0.64
5.13	Aurora Avenue	NB	4,950	4,908	1.20	68	1.01
		SB	4,950	3,195	1.20	12	0.65
5.16	University and Montlake Bridges	NB	4,300	3,820	1.20	204	0.94
		SB	4,300	3,630	1.20	20	0.85
8	South of Lake Union	EB	6,500	4,920	1.20	372	0.81
		WB	4,100	3,300	1.20	39	0.81
1.	SL = Screen Line						
2.	Direction: NB = Northbound, SB = Southbound, EB = Eastbound, WB = Westbound						

<sup>1</sup> Seattle DCLU, 1999

The transportation concurrency analysis indicates that with traffic generated by the Expanded Phase 1, the screenlines would have v/c ratios that are less than the City level of service threshold and thus, the conditions would meet concurrency requirements.

## Transit Impacts

Without site specific programs like a Transportation Management Program (TMP) or Commute Trip Reduction (CTR), the transit mode split is expected to represent about 10 percent of total person trips generated by the Expanded Phase 1. Under the Expanded Phase 1, approximately 575 daily transit trips would be generated by the development. Of those, approximately 105 transit trips would occur during the AM peak hour and approximately 100 transit trips during the PM peak hour.

Through the implementation of a TMP program, transit ridership is anticipated to increase from 10 percent to between 15 and 30 percent. This would result in the Expanded Phase 1 generating up to 1,725 daily transit trips, with approximately 320 occurring during the AM peak hour, and 305 during the PM Peak hour.

Existing transit service is expected to accommodate the additional demand generated by the Expanded Phase 1 with or without a TMP program and, therefore, no significant adverse impacts to transit operations are expected to occur.

## Non-Motorized Travel Impacts

As part of the Expanded Phase 1 the existing sidewalks on each project site frontage would be improved. The Expanded Phase 1 would also provide secure bicycle storage on the project site.

Existing non-motorized facilities within the study area are expected to accommodate the portion of the Expanded Phase 1 trip generation that is expected to walk or bike to the project site. The Expanded Phase 1 would not degrade any existing facilities; the redevelopment would enhance those facilities directly adjacent to each site. Thus, no significant adverse impacts to non-motorized facilities or operations are expected to occur as a result of the Expanded Phase 1 of development.

## Safety Impacts

The addition of Expanded Phase 1 traffic volumes to study intersections and roadways would likely cause a proportionate increase in the probability of traffic accidents. Therefore, it is possible that the proportionate increase in traffic at the intersections of Mercer St/5<sup>th</sup> Avenue, Mercer St/9<sup>th</sup> Avenue, and Denny Way/Westlake Ave. N. may impact the existing safety hazard at these HAL locations. Relative to the *Alternative 2* initial phase analysis presented in the DEIS, these impacts could reasonably be anticipated to be greater owing to the increase in the number of trips generated by the Expanded Phase 1 compared with the DEIS analysis.



## Parking Impacts

### Code Requirements

The City of Seattle parking code requires a minimum of 1.0 stall per 1,000 gsf office space. The minimum parking supply required by the Expanded Phase 1 to meet City of Seattle parking code requirements would be 600 stalls. As part of the Expanded Phase 1, 412 spaces would be built on-site. Seattle Center has agreed to provide 300 spaces for campus use by covenant. Of the 300 spaces, 54 would be allocated to the visitor learning center and retail located in the garage, with the remaining 246 spaces allocated to the campus. The proposed on-site parking stalls and the agreed leased stalls in the Seattle Center Parking Garage count towards meeting the code requirement. The on-site and covenanted parking supply, 658 stalls (412+246) for the Expanded Phase 1 would exceed the code requirement of 600 spaces.

### Parking Supply

On-site parking is proposed both below the Expanded Phase 1 building(s), and in the proposed Seattle Center Parking Garage. A total of approximately 412 on-site parking stalls are proposed as part of the Expanded Phase 1. In addition to the approximately 412 spaces being provided on-site, the Seattle Center has agreed to provide a covenant for 246 stalls in the Seattle Center Parking Garage for exclusive daily use (up to 6:00 pm Monday through Friday) by the Foundation. For the Expanded Phase 1 a total parking supply of 658 parking stalls would be available.

### Parking Demand

Parking demand for the Expanded Phase 1 was calculated considering the size, typical employee density, daily occupancy, and travel mode split of the proposed project. This component yields a demand for long-term commuter parking. The mode-split assumptions are consistent with those identified in the travel mode split section of the Expanded Phase 1 trip generation analysis, which was summarized previously in Table 1. In addition, short-term parking demand required by office use is also considered and is based on rates consistent with previously accepted rates for numerous other Seattle development projects. This methodology is consistent with the parking demand analysis documented in the DEIS. Calculation worksheets for the parking demand analysis are provided in Attachment E.

Peak parking demand for the Expanded Phase 1 would total 1,475 parking stalls. Assuming a total of 658 parking spaces for the Expanded Phase 1 would have an effective supply of 95 percent, or 625 spaces, the peak demand would exceed supply by 850 parking stalls in the unmitigated scenario of the Expanded Phase 1<sup>2</sup>. A Transportation Management Plan (TMP), as discussed in the Mitigation section of the DEIS, could reduce the parking demand by as much as 430 stalls. The calculation worksheets provided in Attachment E illustrate the effect of the TMP goals. Therefore, with a TMP in place, parking demand associated with the Expanded Phase 1 would not be able to be accommodated within the proposed parking supply. A review of parking utilization in the adjacent Seattle Center and Seattle School

<sup>2</sup> The 625 space amount is based on the total 658 stalls reduced factored by a practical capacity factor that takes into account the efficiency lost by circulating the garage in search of a vacant stall.

District parking facilities indicates that sufficient daytime parking supply is available on all but approximately two days per year.

**Table 8. Revised Alternative 2 Initial Phase Parking Summary**

Alternative/Phase	Proposed Parking Supply	Parking Code Regulations	Practical Parking Supply <sup>1</sup>	Parking Demand	Parking Surplus/ Deficit <sup>2</sup>
Base Mode Split Assumptions					
Revised Alternative 2 Initial Phase	658	600	625	1,475	-850
Moderate TMP Assumptions					
Revised Alternative 2 Initial Phase	658	600	625	1,345	-720
Aggressive TMP Assumptions					
Revised Alternative 2 Initial Phase	658	600	625	1,045	-420

1. Assumes a 5% reduction to account for the practical capacity of the parking supply.

2. A parking deficit is indicated by a negative number, a parking surplus is shown by a positive number.

## Construction Impacts

Construction of the Expanded Phase 1, beginning in the first or second quarter of 2008, would generate truck and vehicle traffic associated with earthwork and excavation, delivery of materials to the site and similar types of activities. The highest concentration of truck traffic expected to occur during construction would coincide with the earthwork and excavation activities. Preliminary estimates indicate that approximately 200,000 to 250,000 cubic yards of material would be removed in conjunction with the Expanded Phase 1. This is estimated to generate approximately 20,000 truck trips over a ten to twenty week time frame. Given the estimated construction schedule, the amount of traffic would equate to between 200 and 400 trips per day, depending upon the number of weeks and the number of days per week which excavation would occur. Truck traffic would be substantially less during the remaining periods of construction. The amount of traffic associated with construction, however, is expected to be less than the total development related traffic volumes anticipated.

Construction employees would be required to park off-site in neighboring parking garages or parking lots (including the Seattle Center Parking Garage). Once on-site parking is completed and approved, some construction employees could park on-site for the duration of the construction.

While construction may cause inconveniences proximate to the site, the impacts would be temporary and are not expected to extend to the surrounding study area. To minimize potential impacts, specific routing plans and scheduling could be identified through a construction vehicle routing plan and coordination with SDOT.

## Attachment A: Trip Generation

# Trip Generation Worksheet - 500 Fifth Avenue North

7th edition

## Expanded Phase 1

### Proposed Uses Person Trips

Land Use	Size	Trip Rate	Inbound %	ITE Total Veh Trips	Person Trips AVO = 1.2
Corporate Headquarters Building (LU 714)	600,000 sfgfa				
Daily		7.98 trips/1,000 sq.ft.	50%	4790	5750
AM Peak Hour		1.49 trips/1,000 sq.ft.	93%	895	1075
PM Peak Hour		1.40 trips/1,000 sq.ft.	10%	840	1010

## 500 Fifth Avenue North

### Expanded Phase 1

#### Total Person Trips by Mode of Travel

Trip Generation Summary	Percent of Trips	Percent of Trips	Daily Person Trips	AM Peak Hour			PM Peak Hour		
				In	Out	Total	In	Out	Total
Office									
SOV	80%	80%	4600	800	60	860	80	730	810
Carpool	10%	10%	575	100	10	110	10	90	100
Transit/Non-Motorized	10%	10%	575	100	5	105	10	90	100
Total	100%	100%	5750	1000	75	1075	100	910	1010

*Trip Generation rates were obtained from Trip Generation (ITE, 7th Edition, 2003)*

#### Total Vehicle Trip Generation

Land Use	CP AVO <sup>1</sup>		Daily Vehicle Trips	AM Peak Hour Vehicle Trips			PM Peak Hour Vehicle Trips		
				In	Out	Total	In	Out	Total
Office	2.30		4850	845	65	910	85	770	855
Total			4850	845	65	910	85	770	855

1. Calculations based on local mode-split data from King County CTR.

Attachment B: 2010 Expanded Phase 1 Project  
Trip Assignment

<div>1</div> <div>5TH AVE ROY ST</div> <div></div>	<div>2</div> <div>9TH AVE BROAD ST</div> <div></div>	<div>3</div> <div>WESTLAKE AVE VALLEY ST</div> <div></div>	<div>4</div> <div>FAIRVIEW AVE VALLEY ST</div> <div></div>	<div>5</div> <div>1ST AVENUE MERCER ST</div> <div></div>	<div>6</div> <div>5TH AVE MERCER ST</div> <div></div>
<div>7</div> <div>DEXTER AVE MERCER ST</div> <div></div>	<div>8</div> <div>9TH AVE MERCER ST</div> <div></div>	<div>9</div> <div>WESTLAKE AVE MERCER ST</div> <div></div>	<div>10</div> <div>FAIRVIEW AVE MERCER ST</div> <div></div>	<div>11</div> <div>5TH AVE REPUBLICAN ST</div> <div></div>	<div>12</div> <div>5TH AVE HARRISON ST</div> <div></div>
<div>13</div> <div>BROAD ST HARRISON ST</div> <div></div>	<div>14</div> <div>5TH AVE BROAD ST</div> <div></div>	<div>15</div> <div>1ST AVENUE DENNY WAY</div> <div></div>	<div>16</div> <div>BROAD ST DENNY WAY</div> <div></div>	<div>17</div> <div>5TH AVE DENNY WAY</div> <div></div>	<div>18</div> <div>AURORA AVE DENNY WAY</div> <div></div>
<div>19</div> <div>DEXTER AVE DENNY WAY</div> <div></div>	<div>20</div> <div>WESTLAKE AVE DENNY WAY</div> <div></div>	<div>21</div> <div>FAIRVIEW AVE DENNY WAY</div> <div></div>	<div>22</div> <div>STEWART STREET DENNY WAY</div> <div></div>	<div>23</div> <div>STEWART STREET YALE AVENUE</div> <div></div>	<div>24</div> <div>HOWELL STREET YALE AVENUE</div> <div></div>
<div>LEGEND</div> <div>(X) = AM PEAK HOUR</div> <div>X = PM PEAK HOUR</div>			<div>25</div> <div>SITE DRIVEWAY HARRISON ST</div> <div></div>	<div>26</div> <div>SITE DRIVEWAY MERCER ST</div> <div></div>	<div></div> <div>NOT TO SCALE</div>

Attachment B

2010 Expanded Phase I Project Trip Assignment

00 Fifth Avenue North

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**The  
Transpo  
Group**

## Attachment B 2010 Expanded Phase I Project Trip Assignment

500 Fifth Avenue North



Attachment C: 2010 Expanded Phase 1 With-  
Project Traffic Volumes

<p><b>1</b> 5TH AVE ROY ST</p>	<p><b>2</b> 9TH AVE BROAD ST</p>	<p><b>3</b> WESTLAKE AVE VALLEY ST</p>	<p><b>4</b> FAIRVIEW AVE VALLEY ST</p>	<p><b>5</b> 1ST AVENUE MERCER ST</p>	<p><b>6</b> 5TH AVE MERCER ST</p>
<p><b>7</b> DEXTER AVE MERCER ST</p>	<p><b>8</b> 9TH AVE MERCER ST</p>	<p><b>9</b> WESTLAKE AVE MERCER ST</p>	<p><b>10</b> FAIRVIEW AVE MERCER ST</p>	<p><b>11</b> 5TH AVE REPUBLICAN ST</p>	<p><b>12</b> 5TH AVE HARRISON ST</p>
<p><b>13</b> BROAD ST HARRISON ST</p>	<p><b>14</b> 5TH AVE BROAD ST</p>	<p><b>15</b> 1ST AVENUE DENNY WAY</p>	<p><b>16</b> BROAD ST DENNY WAY</p>	<p><b>17</b> 5TH AVE DENNY WAY</p>	<p><b>18</b> AURORA AVE DENNY WAY</p>
<p><b>19</b> DEXTER AVE DENNY WAY</p>	<p><b>20</b> WESTLAKE AVE DENNY WAY</p>	<p><b>21</b> FAIRVIEW AVE DENNY WAY</p>	<p><b>22</b> STEWART STREET DENNY WAY</p>	<p><b>23</b> STEWART STREET YALE AVENUE</p>	<p><b>24</b> HOWELL STREET YALE AVENUE</p>
<p><b>25</b> SITE DRIVEWAY HARRISON ST</p> <p><b>26</b> SITE DRIVEWAY MERCER ST</p>					



# Attachment C

## 2010 Expanded Phase I With-Project Traffic Volumes

500 Fifth Avenue North



NOT TO SCALE

## Attachment D: LOS Worksheets

# HCM Signalized Intersection Capacity Analysis

1: Roy St & 5th Ave

2010 With-Project Conditions - AM Peak Hour

500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	11	12	11	11	12	11	11	12
Total Lost time (s)				3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Util. Factor				1.00	1.00	1.00	0.95	0.95	1.00	1.00	1.00	
Frpb, ped/bikes				1.00	1.00	1.00	0.98	0.98	1.00	0.98	1.00	
Flpb, ped/bikes				0.96	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Flt				0.99	1.00	1.00	1.00	0.97	1.00	0.97	1.00	
Flt Protected				0.97	1.00	1.00	0.95	0.99	0.95	1.00	1.00	
Satd. Flow (prot)				1396	1564	1327	1564	1327	1662	1432	1662	
Flt Permitted				0.97	0.95	0.99	0.95	0.99	0.95	1.00	1.00	
Satd. Flow (perm)				1396	1564	1327	1564	1327	1662	1432	1662	
Volume (vph)	0	0	0	77	40	5	373	145	58	15	230	60
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	81	42	5	393	153	61	16	242	63
RTOR Reduction (vph)	0	0	0	0	1	0	0	0	7	0	0	6
Lane Group Flow (vph)	0	0	0	0	127	0	327	273	0	16	299	0
Confl. Peds. (#/hr)		7	20		14				12			28
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	6%	6%	6%	5%	5%	5%
Parking (#/hr)				15				8			8	
Turn Type	Perm Split Split											
Protected Phases	6 4 4 8 8											
Permitted Phases	6											
Actuated Green, G (s)	33.0 53.0 53.0 36.0 36.0											
Effective Green, g (s)	36.0 56.0 56.0 39.0 39.0											
Actuated g/C Ratio	0.26 0.40 0.40 0.28 0.28											
Clearance Time (s)	6.0 6.0 6.0 6.0 6.0											
Lane Grp Cap (vph)	359 626 531 463 399											
v/s Ratio Prot	c0.21 0.21 0.01 c0.21											
v/s Ratio Perm	0.09											
v/c Ratio	0.35											
Uniform Delay, d1	42.5 31.9 31.7 36.8 46.0											
Progression Factor	1.00 0.17 0.15 1.00 1.00											
Incremental Delay, d2	2.7 2.7 3.1 0.1 12.1											
Delay (s)	45.1 8.0 7.8 36.9 58.1											
Level of Service	D A A D E											
Approach Delay (s)	0.0 45.1 7.9 57.1											
Approach LOS	A D A E											
Intersection Summary												
HCM Average Control Delay	27.4 HCM Level of Service C											
HCM Volume to Capacity ratio	0.54											
Actuated Cycle Length (s)	140.0 Sum of lost time (s) 9.0											
Intersection Capacity Utilization	55.7% ICU Level of Service B											
Analysis Period (min)	15											
Critical Lane Group												

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# HCM Signalized Intersection Capacity Analysis

2: Broad St & 9th Ave

2010 With-Project Conditions - AM Peak Hour

500 Fifth Avenue North

Movement	EBT	EBR	WBL	WBT	WBR	SBL	SBT	SBR	SBR2
Lane Configurations	↕↕	↕	↕↕	↕↕	↕↕	↕↕↕	↕↕↕	↕↕	↕↕
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	10	10	11	12	9	8	12
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	1.00	0.95	1.00	0.95	1.00	0.91	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt	0.94	1.00	0.99	1.00	0.99	1.00	0.85	1.00	0.85
Flt Protected	1.00	0.95	1.00	0.95	1.00	0.99	1.00	0.99	1.00
Satd. Flow (prot)	2854	1478	2944	3759	1223	3759	1223	3759	1223
Flt Permitted	1.00	0.21	1.00	0.99	1.00	0.99	1.00	0.99	1.00
Satd. Flow (perm)	2854	327	2944	3759	1223	3759	1223	3759	1223
Volume (vph)	255	190	250	1991	140	170	670	137	5
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	271	202	266	2118	149	181	713	146	5
RTOR Reduction (vph)	112	0	0	0	0	0	0	1	0
Lane Group Flow (vph)	361	0	266	2267	0	0	894	150	0
Confl. Peds. (#/hr)	50	50	50	50	50	50	50	50	50
Heavy Vehicles (%)	3%	3%	2%	2%	2%	3%	3%	3%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0	2	0	0
Parking (#/hr)	20	20	20	20	20	20	20	20	20
Turn Type	pm+pt		Split		Split		Prot		
Protected Phases	1		2		3		3		
Permitted Phases	1,2		1,2		3		3		
Actuated Green, G (s)	16.5		75.0		80.5		28.5		
Effective Green, g (s)	19.0		80.0		83.0		31.0		
Actuated g/C Ratio	0.16		0.67		0.69		0.26		
Clearance Time (s)	5.5		5.5		5.5		5.5		
Vehicle Extension (s)	3.0		3.0		3.0		3.0		
Lane Grp Cap (vph)	452		803		2036		971		
v/s Ratio Prot	0.13		0.17		c0.77		c0.24		
v/s Ratio Perm	0.05		0.05		0.05		0.05		
v/c Ratio	0.80		0.33		1.11		0.92		
Uniform Delay, d1	48.7		14.3		18.5		43.3		
Progression Factor	1.00		0.24		0.23		1.00		
Incremental Delay, d2	13.7		0.0		51.8		13.6		
Delay (s)	62.4		3.5		56.1		56.9		
Level of Service	E		A		E		E		
Approach Delay (s)	62.4		50.6		54.3		54.3		
Approach LOS	E		D		D		D		
Intersection Summary									
HCM Average Control Delay	52.9		HCM Level of Service		D		D		
HCM Volume to Capacity ratio	1.06		Sum of lost time (s)		6.0		6.0		
Actuated Cycle Length (s)	120.0		ICU Level of Service		E		E		
Intersection Capacity Utilization	91.0%		Analysis Period (min)		15		15		
Critical Lane Group									

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### HCM Signalized Intersection Capacity Analysis

3: Broad St & Westlake Ave

2010 With-Project Conditions - AM Peak Hour

500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	←	←	←	←	←	←	←	←	←	←	←	←
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	12	12	10	12	12	10	12	12	12	12
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	1.00	0.95	1.00	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	0.98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.91	1.00	1.00	1.00	1.00
Flt Protected	0.98	1.00	1.00	0.85	1.00	0.91	1.00	0.91	1.00	1.00	1.00	1.00
Satd. Flow (prot)	2981	1608	3002	1439	1507	2705	1624	1710				
Flt Permitted	0.73	0.49	1.00	1.00	0.39	1.00	0.19	1.00				
Satd. Flow (perm)	2187	830	3002	1439	625	2705	317	1710				
Volume (vph)	15	340	60	265	2341	770	55	218	328	55	210	0
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	16	354	62	276	2439	802	57	227	342	57	219	0
RTOR Reduction (vph)	0	11	0	0	0	81	0	228	0	0	0	0
Lane Group Flow (vph)	0	421	0	276	2439	721	57	341	0	57	219	0
Conf. Ped. (#/hr)	0	50	50	50	50	50	50	50	50	50	50	50
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	2%	2%	2%	0%	0%	0%
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	2	2	2	2	2	2	2	2	2	2	2	2
Permitted Phases	2	2	2	2	2	2	2	2	2	2	2	2
Actuated Green, G (s)	84.5	84.5	84.5	84.5	24.5	24.5	24.5	24.5	24.5	24.5	24.5	24.5
Effective Green, g (s)	87.0	87.0	87.0	87.0	27.0	27.0	27.0	27.0	27.0	27.0	27.0	27.0
Actuated g/C Ratio	0.72	0.72	0.72	0.72	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22
Clearance Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1586	602	2176	1043	141	609	71	385				
v/s Ratio Prot	0.19	0.33	0.33	0.50	0.09	0.13	0.13	0.13				
v/s Ratio Perm	0.27	0.46	1.12	0.69	0.40	0.56	0.80	0.57				
v/c Ratio	0.27	0.46	1.12	0.69	0.40	0.56	0.80	0.57				
Uniform Delay, d1	5.6	6.8	16.5	9.1	39.6	41.2	44.0	41.3				
Progression Factor	0.70	0.70	0.56	0.50	1.36	2.08	1.00	1.00				
Incremental Delay, d2	0.0	0.4	59.0	1.3	5.3	2.3	61.1	6.0				
Delay (s)	4.0	5.1	68.3	5.9	59.3	88.0	105.1	47.3				
Level of Service	A	A	E	A	E	F	F	D				
Approach Delay (s)	4.0	49.1	49.1	85.3	85.3	85.3	59.2	59.2				
Approach LOS	A	D	D	F	F	F	E	E				
<b>Intersection Summary</b>												
HCM Average Control Delay	50.3											
HCM Volume to Capacity ratio	1.04											
Actuated Cycle Length (s)	120.0											
Intersection Capacity Utilization	123.1%											
Analysis Period (min)	15											
c Critical Lane Group												

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### HCM Signalized Intersection Capacity Analysis

4: Valley St & Fairview Ave

2010 With-Project Conditions - AM Peak Hour

500 Fifth Avenue North

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	←	←	←	←	←	←
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	10	12	12	12	12	12
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	1.00	1.00	1.00	0.95	1.00
Frpb	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	2944	1411	812	3124	4491	1425
Flt Permitted	1.00	1.00	0.14	1.00	0.95	1.00
Satd. Flow (perm)	2944	1411	124	3124	4491	1425
Volume (vph)	633	20	5	722	2444	635
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	673	21	5	768	2600	676
RTOR Reduction (vph)	0	5	0	0	0	9
Lane Group Flow (vph)	673	16	5	768	2600	667
Heavy Vehicles (%)	3%	3%	100%	4%	2%	2%
Turn Type	Perm	Perm	D+P	P	pt+ov	
Protected Phases	4	3	3	4	2	2
Permitted Phases	4	4	4	4	2	2
Actuated Green, G (s)	28.0	28.0	37.0	42.0	68.0	82.0
Effective Green, g (s)	30.0	30.0	41.0	44.0	70.0	84.0
Actuated g/C Ratio	0.25	0.25	0.34	0.37	0.58	0.70
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	736	353	105	1145	2620	998
v/s Ratio Prot	c0.23	0.00	0.00	0.25	c0.58	c0.47
v/s Ratio Perm	0.01	0.01	0.01	0.01	0.01	0.01
v/c Ratio	0.91	0.04	0.05	0.67	0.99	0.67
Uniform Delay, d1	43.8	34.1	27.7	31.9	24.7	10.2
Progression Factor	1.33	1.51	1.00	1.00	1.26	1.33
Incremental Delay, d2	17.2	0.2	0.2	1.6	3.8	0.2
Delay (s)	75.4	51.7	27.9	33.5	35.0	13.7
Level of Service	E	D	C	C	C	B
Approach Delay (s)	74.7	33.4	30.6	30.6	30.6	30.6
Approach LOS	E	C	C	C	C	C
<b>Intersection Summary</b>						
HCM Average Control Delay	37.5					
HCM Volume to Capacity ratio	0.93					
Actuated Cycle Length (s)	120.0					
Intersection Capacity Utilization	80.5%					
Analysis Period (min)	15					
c Critical Lane Group						

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# HCM Signalized Intersection Capacity Analysis

5: Mercer St & 1st Avenue

2010 With-Project Conditions - AM Peak Hour

500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	0.94	1.00	0.95	1.00	0.94	1.00	0.95
Flt Protected	1.00	1.00	1.00	0.95	1.00	1.00	1.00	0.95	1.00	1.00	1.00	0.95
Satd. Flow (prot)	3298	3298	3298	1641	2875	1641	2875	1641	2875	1641	2875	1641
Flt Permitted	1.00	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Satd. Flow (perm)	3298	3298	3298	1641	2875	1641	2875	1641	2875	1641	2875	1641
Volume (vph)	40	1172	0	0	0	0	0	70	190	120	0	0
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	42	1221	0	0	0	0	0	73	198	125	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	45	0	0	0
Lane Group Flow (vph)	0	1263	0	0	0	0	0	73	278	0	0	0
Heavy Vehicles (%)	3%	3%	3%	0%	0%	0%	0%	10%	10%	10%	0%	0%
Parking (#/hr)	3	3	3	0	0	0	0	10%	10%	10%	0%	0%
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	1	1	1	1	1	1	1	1	1	1	1	1
Permitted Phases	1	1	1	1	1	1	1	1	1	1	1	1
Actuated Green, G (s)	46.0	46.0	46.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0
Effective Green, g (s)	47.0	47.0	47.0	27.0	27.0	27.0	27.0	27.0	27.0	27.0	27.0	27.0
Actuated g/C Ratio	0.59	0.59	0.59	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Grp Cap (vph)	1938	1938	1938	554	970	554	970	554	970	554	970	554
v/s Ratio Prot	0.38	0.38	0.38	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
v/c Ratio	0.65	0.65	0.65	0.13	0.29	0.13	0.29	0.13	0.29	0.13	0.29	0.13
Uniform Delay, d1	11.0	11.0	11.0	18.4	19.4	18.4	19.4	18.4	19.4	18.4	19.4	18.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.7	1.7	1.7	0.5	0.7	0.5	0.7	0.5	0.7	0.5	0.7	0.5
Delay (s)	12.7	12.7	12.7	18.9	20.2	18.9	20.2	18.9	20.2	18.9	20.2	18.9
Level of Service	B	B	B	B	B	B	B	B	B	B	B	B
Approach Delay (s)	12.7	12.7	12.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Approach LOS	B	B	B	A	A	A	A	A	A	A	A	A
Intersection Summary												
HCM Average Control Delay	14.5	14.5	14.5	HCM Level of Service	B	B	B	B	B	B	B	B
HCM Volume to Capacity ratio	0.52	0.52	0.52	Sum of lost time (s)	80.0	80.0	80.0	Sum of lost time (s)	6.0	6.0	6.0	6.0
Actuated Cycle Length (s)	80.0	80.0	80.0	ICU Level of Service	B	B	B	ICU Level of Service	B	B	B	B
Intersection Capacity Utilization	55.2%	55.2%	55.2%	Analysis Period (min)	15	15	15	Analysis Period (min)	15	15	15	15
c Critical Lane Group												

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# HCM Signalized Intersection Capacity Analysis

6: Mercer St & 5th Ave

2010 With-Project Conditions - AM Peak Hour

500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	12	11	11	12	12	12	12	11	11	11	11	12
Lane Width	12	11	11	12	12	12	12	11	11	11	11	12
Lane Util. Factor	0.86	1.00	1.00	0.87	1.00	0.87	1.00	0.91	0.91	0.91	0.91	0.86
Flt Protected	1.00	1.00	1.00	0.87	1.00	0.87	1.00	0.92	0.92	0.92	0.92	0.87
Flpb, ped/bikes	1.00	1.00	1.00	0.85	1.00	0.85	1.00	0.85	1.00	0.85	1.00	0.85
Flt Permitted	1.00	1.00	1.00	0.85	1.00	0.85	1.00	0.85	1.00	0.85	1.00	0.85
Satd. Flow (prot)	5722	1303	1303	3069	1244	1512	2835	3069	1244	1512	2835	3069
Flt Permitted	1.00	1.00	1.00	0.86	1.00	0.86	1.00	0.86	1.00	0.86	1.00	0.86
Satd. Flow (perm)	5722	1303	1303	3069	1244	1512	2835	3069	1244	1512	2835	3069
Volume (vph)	15	1154	173	0	0	0	0	556	259	108	219	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	16	1215	182	0	0	0	0	585	273	114	231	0
RTOR Reduction (vph)	0	0	39	0	0	0	0	0	170	0	0	0
Lane Group Flow (vph)	0	1231	143	0	0	0	0	585	103	79	266	0
Confl. Peds. (#/hr)	30	35	35	30	35	30	35	30	35	30	35	30
Heavy Vehicles (%)	4%	4%	4%	0%	0%	0%	0%	5%	5%	5%	5%	5%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	18	0	0	18	0
Parking (#/hr)	25	25	25	25	25	25	25	25	25	25	25	25
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	2	2	2	2	2	2	2	2	2	2	2	2
Permitted Phases	2	2	2	2	2	2	2	2	2	2	2	2
Actuated Green, G (s)	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0
Effective Green, g (s)	46.0	46.0	46.0	46.0	46.0	46.0	46.0	46.0	46.0	46.0	46.0	46.0
Actuated g/C Ratio	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lane Grp Cap (vph)	1880	428	428	1162	471	537	1632	1162	471	537	1632	1162
v/s Ratio Prot	0.22	0.11	0.11	0.03	0.04	0.03	0.04	0.03	0.04	0.03	0.04	0.03
v/c Ratio	0.65	0.33	0.33	0.50	0.22	0.15	0.16	0.50	0.22	0.15	0.16	0.50
Uniform Delay, d1	40.2	35.5	35.5	33.4	29.5	18.7	10.8	33.4	29.5	18.7	10.8	33.4
Progression Factor	1.00	1.00	1.00	0.75	2.00	2.32	2.23	0.75	2.00	2.32	2.23	0.75
Incremental Delay, d2	1.8	2.1	2.1	1.5	1.0	0.5	0.2	1.5	1.0	0.5	0.2	1.5
Delay (s)	42.0	37.5	37.5	34.9	30.5	19.2	11.0	34.9	30.5	19.2	11.0	34.9
Level of Service	D	D	D	C	C	E	D	C	C	E	D	C
Approach Delay (s)	41.4	37.1	37.1	34.9	30.5	19.2	11.0	34.9	30.5	19.2	11.0	34.9
Approach LOS	D	D	D	A	A	A	D	A	A	A	D	A
Intersection Summary												
HCM Average Control Delay	38.3	38.3	38.3	HCM Level of Service	D	D	D	HCM Level of Service	D	D	D	D
HCM Volume to Capacity ratio	0.47	0.47	0.47	Sum of lost time (s)	140.0	140.0	140.0	Sum of lost time (s)	6.0	6.0	6.0	6.0
Actuated Cycle Length (s)	140.0	140.0	140.0	ICU Level of Service	B	B	B	ICU Level of Service	B	B	B	B
Intersection Capacity Utilization	59.5%	59.5%	59.5%	Analysis Period (min)	15	15	15	Analysis Period (min)	15	15	15	15
c Critical Lane Group												

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Synchro 6 Report

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The Transpo Group

HCM Signalized Intersection Capacity Analysis  
7: Mercer St & Dexter Avenue

2010 With-Project Conditions - AM Peak Hour

500 Fifth Avenue North



Movement	EBL	EBT	EBR	WBR	WBT	NBR	SBT	NEL	NER	NER2
Lane Configurations	4TTL									
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	10	11	10	12	12	12
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.86	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95
Flt	0.99	0.86	1.00	0.85	1.00	1.00	1.00	0.87	0.85	
Flt Protected	1.00	1.00	1.00	0.95	1.00	0.99	1.00	0.99	1.00	
Satd. Flow (prot)	5689	1382	2861	1326	1501	3217	1438	1341		
Flt Permitted	1.00	1.00	1.00	1.00	0.51	1.00	0.99	1.00		
Satd. Flow (perm)	5689	1382	2861	1326	809	3217	1438	1341		
Volume (vph)	126	1641	130	35	175	60	235	550	25	275
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	143	1865	148	40	199	68	267	625	28	312
RTOR Reduction (vph)	0	0	22	0	34	0	0	0	1	0
Lane Group Flow (vph)	0	2156	0	18	199	34	267	625	186	159
Heavy Vehicles (%)	2%	2%	2%	7%	6%	6%	1%	1%	3%	3%
Turn Type	Perm	1	custom	1	4	Perm	pm+pt	Prot		
Protected Phases	1							2		
Permitted Phases	1			1	4	3	7	2	2	
Actuated Green, G (s)	60.0	60.0	30.0	30.0	30.0	48.0	48.0	14.0	14.0	
Effective Green, g (s)	63.0	63.0	33.0	33.0	33.0	51.0	51.0	17.0	17.0	
Actuated g/C Ratio	0.45	0.45	0.24	0.24	0.24	0.36	0.36	0.12	0.12	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	
Lane Grp Cap (vph)	2560	622	674	313	369	1172	175	163		
v/s Ratio Prot	0.01	0.07			c0.08	0.19	c0.13	0.12		
v/s Ratio Perm	0.38				0.03	c0.19				
v/c Ratio	0.84	0.03	0.30	0.11	0.72	0.53	1.06	0.98		
Uniform Delay, d1	34.1	21.5	43.9	42.0	36.1	35.1	61.5	61.3		
Progression Factor	0.86	1.00	1.00	1.00	1.00	1.00	1.00	1.00		
Incremental Delay, d2	3.5	0.1	1.1	0.7	11.7	1.7	85.7	64.5		
Delay (s)	32.7	21.5	45.1	42.6	47.8	36.9	147.2	125.8		
Level of Service	C	C	D	D	D	D	F	F		
Approach Delay (s)	32.7		44.4		40.1	137.3				
Approach LOS	C		D		D	F				
<b>Intersection Summary</b>										
HCM Average Control Delay	45.0									
HCM Volume to Capacity ratio	0.82									
Actuated Cycle Length (s)	140.0							9.0		
Intersection Capacity Utilization	77.4%							D		
Analysis Period (min)	15									
c Critical Lane Group										

HCM Signalized Intersection Capacity Analysis  
8: Mercer St & 9th Ave

2010 With-Project Conditions - AM Peak Hour

500 Fifth Avenue North



Movement	EBT	EBR	SBL	SBT	SER
Lane Configurations	4TTL				
Ideal Flow (vphpl)	1900	1900	1900	1900	1900
Lane Width	11	12	12	9	12
Total Lost time (s)	3.0	3.0	3.0	3.0	11
Lane Util. Factor	0.86	0.91	0.91	0.91	
Flt	1.00	1.00	1.00	1.00	
Flt Protected	1.00	1.00	0.99	1.00	
Satd. Flow (prot)	5538	1251	2624		
Flt Permitted	1.00	0.95	1.00		
Satd. Flow (perm)	5538	1251	2624		
Volume (vph)	1971	90	465	710	30
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	2119	97	500	763	32
RTOR Reduction (vph)	5	0	6	6	0
Lane Group Flow (vph)	2211	0	409	874	0
Conf. Peds. (#/hr)			50		
Heavy Vehicles (%)	2%	2%	4%	4%	0%
Bus Blockages (#/hr)	0	0	0	2	0
Turn Type	Perm	Perm	2!	custom	
Protected Phases	1				
Permitted Phases	2				
Actuated Green, G (s)	70.5	38.5	38.5		
Effective Green, g (s)	73.0	41.0	41.0		
Actuated g/C Ratio	0.61	0.34	0.34		
Clearance Time (s)	5.5	5.5	5.5		
Vehicle Extension (s)	3.0	3.0	3.0		
Lane Grp Cap (vph)	3369	427	897		
v/s Ratio Prot	c0.40				
v/s Ratio Perm		0.33	0.33		
v/c Ratio	0.66	0.96	0.97		
Uniform Delay, d1	15.3	38.7	39.0		
Progression Factor	1.00	0.65	0.66		
Incremental Delay, d2	1.0	25.9	19.1		
Delay (s)	16.3	51.0	44.7		
Level of Service	B	D	D		
Approach Delay (s)	16.3		46.7		
Approach LOS	B		D		
<b>Intersection Summary</b>					
HCM Average Control Delay	27.5				
HCM Volume to Capacity ratio	0.77				
Actuated Cycle Length (s)	120.0				
Intersection Capacity Utilization	65.3%				
Analysis Period (min)	15				
! Phase conflict between lane groups.					
c Critical Lane Group					

HCM Signalized Intersection Capacity Analysis  
9: Mercer St & Westlake Ave

2010 With-Project Conditions - AM Peak Hour

500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		4T1T						4T1T				
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	12	12	12	12	12	11	12	12	12	12
Total Lost time (s)	3.0			3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Util. Factor	0.86			0.91	0.91	1.00	1.00	0.91	0.91	1.00	1.00	
Flt Protected	1.00			1.00	0.85	1.00	1.00	1.00	0.85	1.00	1.00	
Satd. Flow (prot)	5534			2893	1272	1624	1710	2893	1272	1624	1710	
Flt Permitted	0.99			1.00	1.00	0.95	1.00	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	5534			2893	1272	1624	1710	2893	1272	1624	1710	
Volume (vph)	291	2480	40	0	0	0	0	340	105	155	250	0
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	303	2583	42	0	0	0	0	354	109	161	260	0
RTOR Reduction (vph)	0	2	0	0	0	0	0	0	42	0	0	0
Lane Group Flow (vph)	0	2926	0	0	0	0	0	354	67	161	260	0
Heavy Vehicles (%)	2%	2%	2%	0%	0%	0%	4%	4%	4%	0%	0%	0%
Turn Type	Perm	4						Perm	Prot			
Protected Phases	4							6	5	2		
Permitted Phases	4							6				
Actuated Green, G (s)	69.8							18.9	18.9	13.8	39.2	
Effective Green, g (s)	72.3							21.9	21.9	16.8	41.7	
Actuated g/C Ratio	0.60							0.18	0.18	0.14	0.35	
Clearance Time (s)	5.5							6.0	6.0	6.0	5.5	
Vehicle Extension (s)	3.0							3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	3334							528	232	227	594	
v/s Ratio Prot								c0.12	c0.10	c0.15		
v/s Ratio Perm	0.53							0.05				
v/c Ratio	0.88							0.67	0.29	0.71	0.44	
Uniform Delay, d1	20.1							45.7	42.3	49.3	30.1	
Progression Factor	0.70							0.90	0.83	0.84	0.71	
Incremental Delay, d2	2.8							3.3	0.7	8.7	0.5	
Delay (s)	16.9							44.6	36.0	50.2	21.8	
Level of Service	B							D	D	D	C	
Approach Delay (s)	16.9			0.0				42.6		32.7		
Approach LOS	B			A				D		C		
Intersection Summary												
HCM Average Control Delay	21.8											
HCM Volume to Capacity ratio	0.81											
Actuated Cycle Length (s)	120.0											
Intersection Capacity Utilization	76.8%											
Analysis Period (min)	15											
Critical Lane Group												

HCM Signalized Intersection Capacity Analysis  
10: Mercer St & Fairview Ave

2010 With-Project Conditions - AM Peak Hour

500 Fifth Avenue North

Movement	EBL	EBT	EBR	EBR2	WBL	WBR	NBL	NBT	NBR	NBR2	SBT
Lane Configurations		4T1T						4T1T			
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	12	12	12	12	12	10	12	12	12
Total Lost time (s)		3.0			3.0	3.0	3.0				
Lane Util. Factor		0.91			0.97	0.88	1.00	0.88			
Flt		1.00			1.00	0.85	1.00	0.85			
Flt Protected		1.00			1.00	1.00	1.00	1.00			
Satd. Flow (prot)		4423			4423	1425	3120	2533			
Flt Permitted		1.00			0.95	1.00	1.00	1.00			
Satd. Flow (perm)		4423			4423	1425	3120	2533			
Volume (vph)	10	2035	375	140	1385	2859	245	335	10	30	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	
Adj. Flow (vph)	10	2098	387	144	1428	2947	253	345	10	31	
RTOR Reduction (vph)	0	0	11	0	0	82	0	1	0	0	
Lane Group Flow (vph)	0	2108	520	0	1428	2865	253	354	0	31	
Heavy Vehicles (%)	2%	2%	2%	2%	1%	1%	3%	3%	3%	21%	
Turn Type	Split	Prot	Prot	Prot	custom	pt-hov					
Protected Phases	1	1	1	1	2	1	2	3	2	3	
Permitted Phases					1	2					
Actuated Green, G (s)	45.5	45.5			37.5	88.5	16.5	59.5		16.5	
Effective Green, g (s)	48.0	48.0			40.0	91.0	23.0	66.0		23.0	
Actuated g/C Ratio	0.40	0.40			0.33	0.76	0.19	0.55		0.19	
Clearance Time (s)	5.5	5.5			5.5		9.5			9.5	
Vehicle Extension (s)	3.0	3.0			3.0		3.0			3.0	
Lane Grp Cap (vph)	1769	570			1040	1921	297	1366		271	
v/s Ratio Prot	0.48	0.36			0.46	c1.13	c0.16	0.14		0.02	
v/s Ratio Perm											
v/c Ratio	1.19	0.91			1.37	1.49	0.85	0.26		0.11	
Uniform Delay, d1	36.0	34.0			40.0	14.5	46.9	14.2		40.1	
Progression Factor	0.78	0.77			1.00	1.00	1.00	1.00		1.13	
Incremental Delay, d2	91.0	17.9			174.0	223.8	20.3	0.1		0.2	
Delay (s)	119.1	44.3			214.0	238.3	67.2	14.3		45.4	
Level of Service	F	D			F	F	E	B		D	
Approach Delay (s)	104.0					36.3				45.4	
Approach LOS	F					D				D	
Intersection Summary											
HCM Average Control Delay	170.7										
HCM Volume to Capacity ratio	1.36										
Actuated Cycle Length (s)	120.0										
Intersection Capacity Utilization	179.4%										
Analysis Period (min)	15										
i Phase conflict between lane groups.											
c Critical Lane Group											



# HCM Signalized Intersection Capacity Analysis 11: Republican St & 5th Ave

500 Fifth Avenue North  
2010 With-Project Conditions - AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	11	11	11	12	11	11	12
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	0.95	1.00	0.91	1.00	0.91	1.00	0.95	1.00	0.95	1.00	0.95
Frpb, ped/bikes	1.00	0.97	1.00	0.97	1.00	0.97	1.00	0.99	1.00	0.99	1.00	0.99
Flpb, ped/bikes	1.00	0.85	1.00	0.95	1.00	0.95	1.00	1.00	1.00	0.99	1.00	1.00
Flt Protected	0.96	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1211	1079	1209	4319	1615	3233						
Flt Permitted	0.96	1.00	0.56	1.00	0.21	1.00						
Satd. Flow (perm)	1211	1079	709	4319	362	3233						
Volume (vph)	0	0	0	32	5	16	15	754	413	52	310	5
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	0	0	0	33	5	16	15	769	421	53	316	5
RTOR Reduction (vph)	0	0	0	0	0	13	0	41	0	0	0	0
Lane Group Flow (vph)	0	0	0	38	3	15	1149	0	53	321	0	0
Confl. Peds. (#/hr)	10	20	20	0	75	20	20	20	20	20	75	75
Heavy Vehicles (%)	0%	0%	0%	33%	33%	33%	7%	7%	7%	7%	7%	7%
Parking (#/hr)	8											
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	6	6	6	8	8	8	8	8	8	8	8	8
Permitted Phases	6	6	6	8	8	8	8	8	8	8	8	8
Actuated Green, G (s)	20.0	20.0	109.0	109.0	109.0	109.0	109.0	109.0	109.0	109.0	109.0	109.0
Effective Green, g (s)	22.0	22.0	112.0	112.0	112.0	112.0	112.0	112.0	112.0	112.0	112.0	112.0
Actuated g/C Ratio	0.16	0.16	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Clearance Time (s)	5.0	5.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	190	170	567	3455	290	2586						
v/s Ratio Prot	0.10											
v/s Ratio Perm	0.03	0.00	0.02									
v/c Ratio	0.20	0.01	0.03	0.33	0.18	0.12						
Uniform Delay, d1	51.3	49.8	2.9	3.8	3.3	3.1						
Progression Factor	1.00	1.00	1.86	2.55	1.18	1.07						
Incremental Delay, d2	0.5	0.0	0.1	0.2	1.4	0.1						
Delay (s)	51.9	49.9	5.4	9.9	5.2	3.4						
Level of Service	D	D	A	A	A	A						
Approach Delay (s)	0.0	51.3	9.9		3.7							
Approach LOS	A	D	D		A							
Intersection Summary												
HCM Average Control Delay	9.8											
HCM Volume to Capacity ratio	0.31											
Actuated Cycle Length (s)	140.0											
Intersection Capacity Utilization	56.6%											
Analysis Period (min)	15											
c Critical Lane Group												

# HCM Signalized Intersection Capacity Analysis 12: Harrison St & 5th Ave

500 Fifth Avenue North  
2010 With-Project Conditions - AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	11	11	11	12	12	11	12
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	1.00	1.00	1.00	1.00	0.88	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Frpb, ped/bikes	1.00	0.87	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.72	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.95	1.00	0.92	1.00	0.85	1.00	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1687	1421	1746	2720	1062	2918						
Flt Permitted	0.23	1.00	0.96	1.00	0.49	1.00						
Satd. Flow (perm)	406	1421	1746	2720	545	2918						
Volume (vph)	5	5	5	50	10	541	10	621	5	5	347	5
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	5	5	5	55	11	595	11	682	5	5	381	5
RTOR Reduction (vph)	0	4	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	5	6	0	0	66	595	11	687	0	0	391	0
Confl. Peds. (#/hr)	5	100	100	100	185	185	115	115	115	115	185	185
Heavy Vehicles (%)	7%	7%	7%	1%	1%	1%	19%	19%	19%	8%	8%	8%
Turn Type	Perm	Perm	Split	Split	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	2	2	6	6	6	6	8	8	8	8	4	4
Permitted Phases	2	2	6	6	6	6	8	8	8	8	4	4
Actuated Green, G (s)	16.5	16.5	34.2	34.2	34.2	75.3	75.3	75.3	75.3	75.3	75.3	75.3
Effective Green, g (s)	17.5	17.5	35.2	35.2	35.2	78.3	78.3	78.3	78.3	78.3	78.3	78.3
Actuated g/C Ratio	0.12	0.12	0.25	0.25	0.25	0.56	0.56	0.56	0.56	0.56	0.56	0.56
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	51	178	439	684	305	1632						
v/s Ratio Prot	0.01											
v/s Ratio Perm	0.10	0.03	0.15	0.87	0.04	0.42						
v/c Ratio	0.10	0.03	0.15	0.87	0.04	0.42						
Uniform Delay, d1	54.3	53.8	40.8	50.2	13.9	17.8						
Progression Factor	1.00	1.00	1.00	1.00	0.95	0.88						
Incremental Delay, d2	0.8	0.1	0.2	11.4	0.2	0.7						
Delay (s)	55.1	53.9	40.9	61.6	13.4	16.5						
Level of Service	E	D	D	E	B	B						
Approach Delay (s)	54.3	59.6	16.4									
Approach LOS	D	E	B									
Intersection Summary												
HCM Average Control Delay	30.3											
HCM Volume to Capacity ratio	0.50											
Actuated Cycle Length (s)	140.0											
Intersection Capacity Utilization	59.4%											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis  
13: Harrison St & Broad St

2010 With-Project Conditions - AM Peak Hour

500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
Sign Control	0	0	5	0	0	0	0	315	5	0	1220	763
Grade	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Volume (veh/h)	0	0	6	0	0	0	0	354	6	0	1371	857
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Hourly flow rate (vph)	0	0	6	0	0	0	0	354	6	0	1371	857
Pedestrians	20											
Lane Width (ft)	11.0											
Walking Speed (ft/s)	4.0											
Percent Blockage	2											
Right turn flare (veh)												
Median type	None											
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
VC, conflicting volume	1996	2179	1134	1042	2605	180	2248					360
vC1, stage 1 conf vol												
vC2, stage 2 conf vol	1996	2179	1134	1042	2605	180	2248					360
vCu, unblocked vol	7.5	6.5	6.9	7.5	6.5	6.9	4.1					4.1
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2					2.2
p0 queue free %	100	100	97	100	100	100	100					100
cM capacity (veh/h)	35	46	197	179	25	838	226					1196
Direction, Lane #	EB 1	NE 1	NE 2	SW 1	SW 2							
Volume Total	6	236	124	914	1314							
Volume Left	0	0	0	0	0							
Volume Right	6	0	6	0	857							
cSH	197	1700	1700	1700	1700							
Volume to Capacity	0.03	0.14	0.07	0.54	0.77							
Queue Length 95th (ft)	2	0	0	0	0							
Control Delay (s)	23.9	0.0	0.0	0.0	0.0							
Lane LOS	C											
Approach Delay (s)	23.9	0.0	0.0	0.0	0.0							
Approach LOS	C											
Intersection Summary												
Average Delay						0.1						
Intersection Capacity Utilization						68.9%				ICU Level of Service	C	
Analysis Period (min)						15						

HCM Signalized Intersection Capacity Analysis  
14: 5th Ave & Broad St

2010 With-Project Conditions - AM Peak Hour

500 Fifth Avenue North

Movement	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	12	12	11	11	11	11	12	11	11	12
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Frpb, ped/bikes	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	3183	3298	3183	3298	3183	3298	3183	3298	3183	3298	3183	3298
Fit Permitted	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (perm)	3183	3298	3183	3298	3183	3298	3183	3298	3183	3298	3183	3298
Volume (vph)	0	439	30	0	336	81	192	285	0	95	1090	5
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	0	443	30	0	339	82	194	288	0	96	1101	5
RTOR Reduction (vph)	0	3	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	470	0	0	339	82	194	288	0	96	1106	0
Conf. Peds. (#/hr)	115	85	85	115	130	115	130	115	45	45	130	7
Heavy Vehicles (%)	3%	3%	3%	2%	2%	2%	10%	10%	10%	7%	7%	7%
Bus Blockages (#/hr)	0	20	0	0	18	0	0	0	0	0	0	0
Turn Type												
Protected Phases	8			4			5		2		1	6
Permitted Phases								4				
Actuated Green, G (s)	43.0			43.0			43.0		47.0		29.0	47.0
Effective Green, g (s)	49.0			49.0			49.0		50.0		32.0	50.0
Actuated g/C Ratio	0.35			0.35			0.35		0.36		0.23	0.36
Clearance Time (s)	9.0			9.0			9.0		6.0		6.0	6.0
Lane Grp Cap (vph)	1114			1154			403		363		1133	373
v/s Ratio Prot	c0.15			0.10			c0.12		0.09		0.06	c0.34
v/s Ratio Perm							0.07					
v/c Ratio	0.42			0.29			0.20		0.53		0.26	0.95
Uniform Delay, d1	34.7			33.0			31.8		47.5		31.8	43.8
Progression Factor	1.04			0.98			0.98		0.97		0.91	1.00
Incremental Delay, d2	1.2			0.6			1.1		5.5		0.5	1.7
Delay (s)	37.3			32.9			32.4		51.7		29.5	45.9
Level of Service	D			C			C		D		C	E
Approach Delay (s)	37.3			32.8			38.5		38.5		59.6	59.6
Approach LOS	D			C			D		D		E	E
Intersection Summary												
HCM Average Control Delay												
HCM Volume to Capacity ratio												
Actuated Cycle Length (s)												
Intersection Capacity Utilization												
Analysis Period (min)												
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis  
15: Denny Way & 1st Avenue

2010 With-Project Conditions - AM Peak Hour

500 Fifth Avenue North



Movement	EBL	EBT	EBR	WBL	WBT	WBR	SBL	SBR	NWL	NWR	NWR2
Lane Configurations	↕	↕	↕	↕	↕	↕	↕	↕	↕	↕	↕
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0			3.0			3.0		3.0		3.0
Lane Util. Factor	0.95			0.91			0.98		1.00		0.95
Flt	0.98			0.96			0.98		0.98		0.85
Flt Protected	1.00			1.00			1.00		0.96		1.00
Satd. Flow (prot)	3444			4796			1449		1449		1189
Flt Permitted	1.00			1.00			1.00		0.96		1.00
Satd. Flow (perm)	3444			4796			1449		1449		1189
Volume (vph)	0	1957	255	0	933	320	0	0	160	160	10
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	0	2018	263	0	962	330	0	0	165	165	10
RTOR Reduction (vph)	0	10	0	0	62	0	0	0	0	2	0
Lane Group Flow (vph)	0	2271	0	0	1230	0	0	0	187	151	0
Heavy Vehicles (%)	3%	3%	3%	4%	4%	4%	0%	0%	11%	11%	11%
Parking (#/hr)											
Turn Type											
Protected Phases	1			1					2		
Permitted Phases											2
Actuated Green, G (s)	69.0			69.0					21.0	21.0	
Effective Green, g (s)	71.0			71.0					23.0	23.0	
Actuated g/C Ratio	0.71			0.71					0.23	0.23	
Clearance Time (s)	5.0			5.0					5.0	5.0	
Lane Grp Cap (vph)	2445			3405					333	273	
v/s Ratio Prot	c0.66			0.26					c0.13		
v/s Ratio Perm											
v/c Ratio	0.93			0.36					0.56	0.55	
Uniform Delay, d1	12.3			5.7					34.0	34.0	
Progression Factor	1.00			0.98					1.00	1.00	
Incremental Delay, d2	7.7			0.2					6.7	7.8	
Delay (s)	20.1			5.8					40.7	41.8	
Level of Service	C			A					D	D	
Approach Delay (s)	20.1			5.8					41.2		
Approach LOS	C			A					D		
Intersection Summary											
HCM Average Control Delay	17.2										
HCM Volume to Capacity ratio	0.84										
Actuated Cycle Length (s)	100.0										
Intersection Capacity Utilization	84.7%										
Analysis Period (min)	15										
Critical Lane Group											

HCM Signalized Intersection Capacity Analysis  
16: Denny Way & Broad St

2010 With-Project Conditions - AM Peak Hour

500 Fifth Avenue North



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	NWL	NWR	SWL	SWR
Lane Configurations	↕	↕	↕	↕	↕	↕	↕	↕	↕	↕	↕	↕	↕
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	12	12	11	12	12	10	12	12	10	12	10
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Flpb. ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	1.00	0.99	1.00	0.99	1.00
Flpb. ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	1.00	0.99	1.00	0.85	1.00
Flt	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	1.00	0.99	1.00	0.85	1.00
Flt Protected	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	3361	3285	3285	3154	3154	3154	3154	3154	3154	3154	3303	1361	3303
Flt Permitted	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (perm)	3361	3285	3285	3154	3154	3154	3154	3154	3154	3154	3303	1361	3303
Volume (vph)	0	1110	0	0	985	5	0	422	35	0	553	516	516
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	1168	0	0	1037	5	0	444	37	0	582	545	545
RTOR Reduction (vph)	0	0	0	0	0	0	0	6	0	0	0	48	0
Lane Group Flow (vph)	0	1168	0	0	1042	0	0	475	0	0	582	497	497
Conf. Peds. (#/hr)	22	12	12	12	12	22	18	34	34	34	18	18	18
Heavy Vehicles (%)	3%	3%	3%	4%	4%	4%	5%	5%	5%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	4	0	0	10	0	0	0	0	0	0	0	0
Turn Type	1	1	1	1	1	1	2	2	2	2	2	2	2
Protected Phases													
Permitted Phases													
Actuated Green, G (s)	53.0	53.0	53.0	53.0	53.0	53.0	37.0	37.0	37.0	37.0	37.0	37.0	37.0
Effective Green, g (s)	55.0	55.0	55.0	55.0	55.0	55.0	39.0	39.0	39.0	39.0	39.0	39.0	39.0
Actuated g/C Ratio	0.55	0.55	0.55	0.55	0.55	0.55	0.39	0.39	0.39	0.39	0.39	0.39	0.39
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lane Grp Cap (vph)	1849	1807	1807	1230	1230	1230	1230	1230	1230	1230	1288	531	1288
v/s Ratio Prot	c0.35	0.32	0.32	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.18	0.37	0.37
v/s Ratio Perm													
v/c Ratio	0.63	0.58	0.58	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.45	0.94	0.94
Uniform Delay, d1	15.5	14.8	14.8	21.9	21.9	21.9	21.9	21.9	21.9	21.9	22.6	29.3	29.3
Progression Factor	0.54	0.87	0.87	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.6	1.3	1.3	0.9	0.9	0.9	0.9	0.9	0.9	0.9	1.1	26.1	26.1
Delay (s)	8.9	14.2	14.2	22.8	22.8	22.8	22.8	22.8	22.8	22.8	23.7	55.5	55.5
Level of Service	A	B	B	C	C	C	C	C	C	C	C	E	E
Approach Delay (s)	8.9	14.2	14.2	22.8	22.8	22.8	22.8	22.8	22.8	22.8	39.0	39.0	39.0
Approach LOS	A	B	B	C	C	C	C	C	C	C	D	D	D
Intersection Summary													
HCM Average Control Delay	21.0												
HCM Volume to Capacity ratio	0.76												
Actuated Cycle Length (s)	100.0												
Intersection Capacity Utilization	67.9%												
Analysis Period (min)	15												
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis  
17: Denny Way & 5th Ave

HCM Signalized Intersection Capacity Analysis  
17: Denny Way & 5th Ave

2010 With-Project Conditions - AM Peak Hour

2010 With-Project Conditions - AM Peak Hour

500 Fifth Avenue North

500 Fifth Avenue North

Movement	EBT	EBR	EBR2	WBT	WBR	NBL	NBT	NBR	NBR2	SBL2	SBL	SBT
Lane Configurations	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	10	12	12	10	12	12	11	12	13
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	1.00	1.00	1.00
Frpb, ped/bikes	0.99	0.99	0.99	0.99	0.99	1.00	1.00	1.00	1.00	1.00	0.99	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3174	3174	3025	3025	2897	2897	1752	1752	1856	1856	1856	1856
Flt Permitted	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3174	3174	3025	3025	2897	2897	1752	1752	1856	1856	1856	1856
Volume (vph)	710	370	10	755	369	5	60	15	15	70	203	95
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	747	389	11	795	388	5	63	16	16	74	214	100
RTOR Reduction (vph)	0	0	0	49	0	0	15	0	0	0	0	6
Lane Group Flow (vph)	1147	0	0	1134	0	0	85	0	0	0	288	110
Confl. Peds. (#/hr)	8	23	17									
Heavy Vehicles (%)	2%	2%	2%	4%	4%	8%	8%	8%	8%	3%	3%	3%
Bus Blockages (#/hr)	4	0	0	2	0	0	11	0	0	0	0	0
Turn Type	1	3	3	3	3	3	3	3	3	3	3	3
Protected Phases	1	3	3	3	3	3	3	3	3	3	3	3
Permitted Phases	1	3	3	3	3	3	3	3	3	3	3	3
Actuated Green, G (s)	58.7	58.7	58.7	58.7	58.7	58.7	58.7	58.7	58.7	58.7	58.7	58.7
Effective Green, g (s)	60.7	60.7	60.7	60.7	60.7	60.7	60.7	60.7	60.7	60.7	60.7	60.7
Actuated g/C Ratio	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1927	1836	1836	1836	1836	1836	1836	1836	1836	1836	1836	1836
v/s Ratio Prot	0.36	0.36	0.36	0.36	0.36	0.36	0.36	0.36	0.36	0.36	0.36	0.36
v/s Ratio Perm	0.36	0.36	0.36	0.36	0.36	0.36	0.36	0.36	0.36	0.36	0.36	0.36
v/c Ratio	0.60	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62
Uniform Delay, d1	12.1	12.4	12.4	12.4	12.4	12.4	12.4	12.4	12.4	12.4	12.4	12.4
Progression Factor	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11
Incremental Delay, d2	1.2	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Delay (s)	2.6	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7
Level of Service	A	B	B	B	B	B	B	B	B	B	B	B
Approach Delay (s)	2.6	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7
Approach LOS	A	B	B	B	B	B	B	B	B	B	B	B
Intersection Summary												
HCM Average Control Delay	14.0											
HCM Volume to Capacity ratio	0.63											
Actuated Cycle Length (s)	100.0											
Intersection Capacity Utilization	61.9%											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis  
18: Denny Way & Aurora Ave

2010 With-Project Conditions - AM Peak Hour

500 Fifth Avenue North

Movement	EBT	EBR	EBR2	WBT	WBR	NBT	NBR	NBR2	SBL2	SBL	SBT	SBR
Lane Configurations	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	11	12	12	12	12	12	12	12	12
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Frt	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Flt Protected	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	3020	2966	3094	3094	3094	1577	1319	1341	1577	1319	1341	1341
Flt Permitted	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	3020	2966	3094	3094	3094	1577	1319	1341	1577	1319	1341	1341
Volume (vph)	945	135	5	1067	145	295	65	5	340	165	0	825
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	995	142	5	1123	153	311	68	5	358	174	0	868
RTOR Reduction (vph)	0	0	0	10	0	0	0	0	0	0	0	2
Lane Group Flow (vph)	1142	0	0	1266	0	384	0	0	0	532	442	440
Heavy Vehicles (%)	2%	2%	2%	4%	4%	2%	2%	2%	3%	3%	3%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	4
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	2	2	2	4	4	3	3	3	3	3	3	8
Permitted Phases	Protected Phases	Protected Phases	Protected Phases	Protected Phases	Protected Phases	Protected Phases	Protected Phases	Protected Phases	Protected Phases	Protected Phases	Protected Phases	Protected Phases
Actuated Green, G (s)	30.1	30.1	30.1	16.9	16.9	34.0	55.9	55.9	34.0	55.9	55.9	55.9
Effective Green, g (s)	36.1	36.1	36.1	18.9	18.9	36.0	57.9	57.9	36.0	57.9	57.9	57.9
Actuated g/C Ratio	0.36	0.36	0.36	0.19	0.19	0.36	0.58	0.58	0.36	0.58	0.58	0.58
Clearance Time (s)	9.0	9.0	9.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1090	1071	585	585	585	568	764	776	568	764	776	776
v/s Ratio Prot	0.38	c0.43	c0.12	c0.12	c0.12	c0.34	0.34	0.33	c0.34	0.34	0.33	0.33
v/s Ratio Perm	1.05	1.18	0.66	0.66	0.66	0.94	0.58	0.57	0.94	0.58	0.57	0.57
Uniform Delay, d1	31.9	31.9	37.5	37.5	37.5	30.9	13.3	13.2	30.9	13.3	13.2	13.2
Progression Factor	1.17	0.61	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	40.2	89.4	2.7	2.7	2.7	23.0	1.1	1.0	23.0	1.1	1.0	1.0
Delay (s)	77.7	108.8	40.2	40.2	40.2	53.9	14.4	14.2	53.9	14.4	14.2	14.2
Level of Service	E	F	D	D	D	D	D	B	D	D	B	B
Approach Delay (s)	77.7	108.8	40.2	40.2	40.2	29.2			29.2			
Approach LOS	E	F	D	D	D	C			C			
Intersection Summary												
HCM Average Control Delay	67.4											
HCM Volume to Capacity ratio	0.98											
Actuated Cycle Length (s)	100.0											
Intersection Capacity Utilization	90.5%											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis  
18: Denny Way & Aurora Ave

2010 With-Project Conditions - AM Peak Hour

500 Fifth Avenue North

Movement	EBT	EBR	EBR2	WBT	WBR	NBT	NBR	NBR2	SBL2	SBL	SBT	SBR
Lane Configurations	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	11	12	12	12	12	12	12	12	12
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Frt	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Flt Protected	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	3020	2966	3094	3094	3094	1577	1319	1341	1577	1319	1341	1341
Flt Permitted	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	3020	2966	3094	3094	3094	1577	1319	1341	1577	1319	1341	1341
Volume (vph)	945	135	5	1067	145	295	65	5	340	165	0	825
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	995	142	5	1123	153	311	68	5	358	174	0	868
RTOR Reduction (vph)	0	0	0	10	0	0	0	0	0	0	0	2
Lane Group Flow (vph)	1142	0	0	1266	0	384	0	0	0	532	442	440
Heavy Vehicles (%)	2%	2%	2%	4%	4%	2%	2%	2%	3%	3%	3%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	4
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	2	2	2	4	4	3	3	3	3	3	3	8
Permitted Phases	Protected Phases	Protected Phases	Protected Phases	Protected Phases	Protected Phases	Protected Phases	Protected Phases	Protected Phases	Protected Phases	Protected Phases	Protected Phases	Protected Phases
Actuated Green, G (s)	30.1	30.1	30.1	16.9	16.9	34.0	55.9	55.9	34.0	55.9	55.9	55.9
Effective Green, g (s)	36.1	36.1	36.1	18.9	18.9	36.0	57.9	57.9	36.0	57.9	57.9	57.9
Actuated g/C Ratio	0.36	0.36	0.36	0.19	0.19	0.36	0.58	0.58	0.36	0.58	0.58	0.58
Clearance Time (s)	9.0	9.0	9.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1090	1071	585	585	585	568	764	776	568	764	776	776
v/s Ratio Prot	0.38	c0.43	c0.12	c0.12	c0.12	c0.34	0.34	0.33	c0.34	0.34	0.33	0.33
v/s Ratio Perm	1.05	1.18	0.66	0.66	0.66	0.94	0.58	0.57	0.94	0.58	0.57	0.57
Uniform Delay, d1	31.9	31.9	37.5	37.5	37.5	30.9	13.3	13.2	30.9	13.3	13.2	13.2
Progression Factor	1.17	0.61	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	40.2	89.4	2.7	2.7	2.7	23.0	1.1	1.0	23.0	1.1	1.0	1.0
Delay (s)	77.7	108.8	40.2	40.2	40.2	53.9	14.4	14.2	53.9	14.4	14.2	14.2
Level of Service	E	F	D	D	D	D	D	B	D	D	B	B
Approach Delay (s)	77.7	108.8	40.2	40.2	40.2	29.2			29.2			
Approach LOS	E	F	D	D	D	C			C			
Intersection Summary												
HCM Average Control Delay	67.4											
HCM Volume to Capacity ratio	0.98											
Actuated Cycle Length (s)	100.0											
Intersection Capacity Utilization	90.5%											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis  
19: Denny Way & Dexter Avenue

2010 With-Project Conditions - AM Peak Hour  
500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	0.95	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Frt Protected	1.00	1.00	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3207	3151	3151	1354	2887	1593	3185	1425	1425	1425	1425	1425
Flt Permitted	0.77	1.00	0.44	1.00	0.69	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (perm)	2472	3151	624	2687	1158	3185	1425	1425	1425	1425	1425	1425
Volume (vph)	65	1200	5	0	985	75	5	85	5	150	295	247
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	71	1304	5	0	1071	82	5	92	5	163	321	268
RTOR Reduction (vph)	0	0	0	0	5	0	0	4	0	0	0	206
Lane Group Flow (vph)	0	1380	0	0	1148	0	5	93	0	163	321	62
Heavy Vehicles (%)	1%	1%	1%	2%	2%	2%	20%	20%	20%	2%	2%	2%
Turn Type	pm+pt	2	5	1	1	1	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	5	5	5	5	5	5	3	3	3	3	3	3
Permitted Phases	5	5	5	5	5	5	3	3	3	3	3	3
Actuated Green, G (s)	67.9	49.9	20.1	20.1	20.1	20.1	20.1	20.1	20.1	20.1	20.1	20.1
Effective Green, g (s)	70.9	52.9	23.1	23.1	23.1	23.1	23.1	23.1	23.1	23.1	23.1	23.1
Actuated g/C Ratio	0.71	0.53	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1863	1667	144	621	1667	144	621	267	736	329	329	329
v/s Ratio Prot	c0.11	0.36	0.01	0.03	0.01	0.01	0.03	0.01	0.03	0.14	0.04	0.04
v/s Ratio Perm	0.74	0.69	0.03	0.15	0.61	0.61	0.44	0.19	0.19	0.44	0.19	0.19
v/c Ratio	8.9	17.5	29.8	30.6	34.4	32.9	30.9	30.9	30.9	30.9	30.9	30.9
Uniform Delay, d1	0.61	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Progression Factor	0.1	2.4	0.1	0.1	4.1	4.1	0.4	0.3	0.3	0.3	0.3	0.3
Incremental Delay, d2	5.5	19.8	29.9	30.7	38.5	33.3	31.2	31.2	31.2	31.2	31.2	31.2
Delay (s)	A	B	C	C	D	D	C	C	C	C	C	C
Level of Service	A	B	C	C	D	D	C	C	C	C	C	C
Approach Delay (s)	5.5	19.8	30.7	30.7	33.7	33.7	33.7	33.7	33.7	33.7	33.7	33.7
Approach LOS	A	B	C	C	D	D	C	C	C	C	C	C
Intersection Summary												
HCM Average Control Delay	17.4											
HCM Volume to Capacity ratio	0.70											
Actuated Cycle Length (s)	100.0											
Intersection Capacity Utilization	97.9%											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis  
20: Denny Way & Westlake Ave

2010 With-Project Conditions - AM Peak Hour  
500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	12	11	12	12	11	12	12	11	12	12	12	12
Lane Width	12	11	12	12	11	12	12	11	12	12	12	12
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Frt Protected	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	3063	2966	2966	2838	1624	3210	3210	3210	3210	3210	3210	3210
Flt Permitted	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (perm)	3063	2966	2966	2838	1624	3210	3210	3210	3210	3210	3210	3210
Volume (vph)	0	1365	50	0	1030	140	0	280	80	95	110	10
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	1422	52	0	1073	146	0	292	83	99	115	10
RTOR Reduction (vph)	0	2	0	0	8	0	0	30	0	0	7	0
Lane Group Flow (vph)	0	1472	0	0	1211	0	0	345	0	99	118	0
Heavy Vehicles (%)	2%	2%	2%	4%	4%	4%	7%	7%	7%	0%	0%	0%
Turn Type	Perm	1	1	1	1	1	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	1	1	1	1	1	1	2	2	2	2	2	2
Permitted Phases	1	1	1	1	1	1	2	2	2	2	2	2
Actuated Green, G (s)	71.5	71.5	71.5	71.5	71.5	71.5	18.5	18.5	18.5	18.5	18.5	18.5
Effective Green, g (s)	73.5	73.5	73.5	73.5	73.5	73.5	20.5	20.5	20.5	20.5	20.5	20.5
Actuated g/C Ratio	0.74	0.74	0.74	0.74	0.74	0.74	0.20	0.20	0.20	0.20	0.20	0.20
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	2251	2180	2180	2180	2180	2180	582	582	124	658	658	658
v/s Ratio Prot	c0.48	0.41	0.41	0.41	0.41	0.41	0.12	0.12	0.04	0.04	0.04	0.04
v/s Ratio Perm	0.65	0.56	0.56	0.56	0.56	0.56	0.59	0.59	0.80	0.18	0.18	0.18
Uniform Delay, d1	6.8	5.9	5.9	5.9	5.9	5.9	36.0	36.0	37.8	32.8	32.8	32.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.14	1.14	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.5	1.0	1.0	1.0	1.0	1.0	1.6	1.6	29.0	0.1	0.1	0.1
Delay (s)	8.3	7.0	7.0	7.0	7.0	7.0	42.5	42.5	66.8	32.9	32.9	32.9
Level of Service	A	A	A	A	A	A	D	D	E	C	C	C
Approach Delay (s)	8.3	7.0	7.0	7.0	7.0	7.0	42.5	42.5	47.9	47.9	47.9	47.9
Approach LOS	A	A	A	A	A	A	D	D	E	C	C	C
Intersection Summary												
HCM Average Control Delay	14.4											
HCM Volume to Capacity ratio	0.69											
Actuated Cycle Length (s)	100.0											
Intersection Capacity Utilization	71.0%											
Analysis Period (min)	15											
c Critical Lane Group												



# HCM Signalized Intersection Capacity Analysis

21: Denny Way & Fairview Ave

500 Fifth Avenue North  
2010 With-Project Conditions - AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	12	11	11	12	9	10	12	10	10	12
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	0.97	0.95	1.00	0.95	1.00	0.95
Flt Protected	1.00	1.00	1.00	0.98	1.00	0.98	1.00	0.97	1.00	0.95	1.00	0.95
Satd. Flow (prot)	1555	3098	1540	3015	2781	2896	1458	2772	1458	2772	1458	2772
Flt Permitted	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	1555	3098	1540	3015	2781	2896	1458	2772	1458	2772	1458	2772
Volume (vph)	140	775	20	40	893	145	377	290	60	100	325	160
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	149	824	21	43	950	154	401	309	64	106	346	170
RTOR Reduction (vph)	0	2	0	0	12	0	0	19	0	0	64	0
Lane Group Flow (vph)	149	843	0	43	1092	0	401	354	0	106	452	0
Heavy Vehicles (%)	1%	1%	1%	2%	2%	2%	2%	2%	2%	4%	4%	4%
Turn Type	Prot	1	6	5	2	2	3	8	7	4	4	4
Protected Phases	1	6	5	2	2	3	8	7	4	4	4	4
Permitted Phases	1	6	5	2	2	3	8	7	4	4	4	4
Actuated Green, G (s)	11.5	39.3	5.2	33.0	5.2	33.0	15.0	26.8	8.7	20.5	8.7	20.5
Effective Green, g (s)	13.5	41.3	7.2	35.0	7.2	35.0	17.0	28.8	10.7	22.5	10.7	22.5
Actuated g/C Ratio	0.14	0.41	0.07	0.35	0.07	0.35	0.17	0.29	0.11	0.22	0.11	0.22
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	210	1279	111	1055	473	834	156	624	156	624	156	624
v/s Ratio Prot	c0.10	0.27	0.03	c0.36	0.13	c0.43	0.07	c0.16	0.07	c0.16	0.07	c0.16
v/s Ratio Perm												
v/c Ratio	0.71	0.66	0.39	1.03	0.39	1.03	0.85	0.43	0.68	0.73	0.68	0.73
Uniform Delay, d1	41.4	23.7	44.3	32.5	40.2	28.9	43.0	35.9	43.0	35.9	43.0	35.9
Progression Factor	1.00	1.00	1.15	0.96	1.00	1.00	1.00	1.00	1.11	0.76	1.00	1.00
Incremental Delay, d2	10.5	2.7	1.4	31.3	13.2	0.4	10.1	3.7	10.1	3.7	10.1	3.7
Delay (s)	51.8	26.4	52.3	62.7	53.5	29.2	57.7	31.0	57.7	31.0	57.7	31.0
Level of Service	D	C	D	E	D	C	E	C	E	C	E	C
Approach Delay (s)	30.2	62.3	62.3	62.3	62.3	62.3	41.8	35.5	41.8	35.5	41.8	35.5
Approach LOS	C	E	E	E	E	E	D	D	D	D	D	D
Intersection Summary												
HCM Average Control Delay	44.1											
HCM Volume to Capacity ratio	0.87											
Actuated Cycle Length (s)	100.0											
Intersection Capacity Utilization	82.1%											
Analysis Period (min)	15											
Critical Lane Group												

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# HCM Signalized Intersection Capacity Analysis

22: Denny Way & Stewart St

500 Fifth Avenue North  
2010 With-Project Conditions - AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	1.00	1.00	1.00	0.95	1.00	1.00	1.00	0.95	1.00	1.00	1.00	1.00
Satd. Flow (prot)	2961	1593	1676	1593	1676	1593	1676	1593	1676	1593	1676	1593
Flt Permitted	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Satd. Flow (perm)	2961	1593	1676	1593	1676	1593	1676	1593	1676	1593	1676	1593
Volume (vph)	0	493	262	545	1013	0	0	0	0	0	190	1950
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	514	273	568	1055	0	0	0	0	0	198	2031
RTOR Reduction (vph)	0	34	0	0	0	0	0	0	0	0	0	11
Lane Group Flow (vph)	0	753	0	568	1055	0	0	0	0	0	0	2379
Heavy Vehicles (%)	4%	4%	4%	2%	2%	2%	0%	0%	0%	0%	5%	5%
Turn Type	Prot	3	2	2	3	Prot	2	3	2	3	1	1
Protected Phases	3	2	2	3	Prot	2	3	2	3	1	1	1
Permitted Phases	3	2	2	3	Prot	2	3	2	3	1	1	1
Actuated Green, G (s)	20.5	29.5	54.5	29.5	54.5	20.5	29.5	54.5	29.5	54.5	36.5	36.5
Effective Green, g (s)	22.0	31.0	56.0	31.0	56.0	22.0	31.0	56.0	31.0	56.0	38.0	38.0
Actuated g/C Ratio	0.22	0.31	0.56	0.31	0.56	0.22	0.31	0.56	0.31	0.56	0.38	0.38
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	651	494	939	494	939	651	494	939	494	939	2099	2099
v/s Ratio Prot	0.25	c0.36	c0.63	0.36	c0.63	0.25	c0.36	c0.63	0.36	c0.63	c0.43	c0.43
v/s Ratio Perm												
v/c Ratio	1.16	1.15	1.12	1.15	1.12	1.16	1.15	1.12	1.15	1.12	1.13	1.13
Uniform Delay, d1	39.0	34.5	22.0	34.5	22.0	39.0	34.5	22.0	34.5	22.0	31.0	31.0
Progression Factor	0.94	1.00	1.00	1.00	1.00	0.94	1.00	1.00	1.00	1.00	0.85	0.85
Incremental Delay, d2	86.5	88.7	69.5	88.7	69.5	86.5	88.7	69.5	88.7	69.5	65.7	65.7
Delay (s)	123.2	123.2	91.5	123.2	91.5	123.2	123.2	91.5	123.2	91.5	91.9	91.9
Level of Service	F	F	F	F	F	F	F	F	F	F	F	F
Approach Delay (s)	123.2	102.6	102.6	102.6	102.6	123.2	102.6	102.6	102.6	102.6	91.9	91.9
Approach LOS	F	F	F	F	F	F	F	F	F	F	F	F
Intersection Summary												
HCM Average Control Delay	100.6											
HCM Volume to Capacity ratio	1.13											
Actuated Cycle Length (s)	100.0											
Intersection Capacity Utilization	105.5%											
Analysis Period (min)	15											
Critical Lane Group												

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# HCM Signalized Intersection Capacity Analysis

23: Yale St & Stewart St

500 Fifth Avenue North

2010 With-Project Conditions - AM Peak Hour

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	SWL	SWT	SWR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Total Lost time (s)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1660	1411	1624	1710	1710	1562	1489	1562	1489	1562	1489
Flt Permitted	1.00	1.00	0.41	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	1660	1411	696	1710	1710	1562	1489	1562	1489	1562	1489
Volume (vph)	0	212	45	30	10	0	0	0	0	570	1930
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	0	216	46	31	10	0	0	0	0	582	1969
RTOR Reduction (vph)	0	0	21	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	216	25	31	10	0	0	0	0	582	1969
Heavy Vehicles (%)	3%	3%	3%	0%	0%	0%	0%	0%	0%	4%	4%
Turn Type	3	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	3	3	3	3	3	3	3	3	3	3	3
Permitted Phases	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5
Actuated Green, G (s)	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0
Effective Green, g (s)	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22
Actuated g/C Ratio	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Clearance Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Vehicle Extension (s)	365	310	153	376	376	1125	3232	1125	3232	1125	3232
Lane Grp Cap (vph)	c0.13	0.02	0.04	0.01	0.01	0.37	c0.44	0.37	c0.44	0.37	c0.44
v/s Ratio Prot	0.59	0.08	0.20	0.03	0.03	0.52	0.61	0.52	0.61	0.52	0.61
v/c Ratio	35.0	31.0	31.8	30.6	30.6	6.2	7.0	6.2	7.0	6.2	7.0
Uniform Delay, d1	0.94	1.13	0.33	0.30	0.30	0.30	0.31	0.30	0.31	0.30	0.31
Progression Factor	2.2	0.1	0.6	0.0	0.0	0.2	0.1	0.2	0.1	0.2	0.1
Incremental Delay, d2	34.9	35.0	11.3	9.3	9.3	2.0	2.3	2.0	2.3	2.0	2.3
Delay (s)	C	D	B	A	A	A	A	A	A	A	A
Level of Service	35.0	C	B	A	A	A	A	A	A	A	A
Approach Delay (s)	C	C	B	B	B	A	A	A	A	A	A
Approach LOS	C	C	B	B	B	A	A	A	A	A	A
Intersection Summary											
HCM Average Control Delay	5.3										
HCM Volume to Capacity ratio	0.61										
Actuated Cycle Length (s)	100.0										
Intersection Capacity Utilization	67.2%										
Analysis Period (min)	15										
c Critical Lane Group											

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# HCM Signalized Intersection Capacity Analysis

24: Yale St & Howell St

500 Fifth Avenue North

2010 With-Project Conditions - AM Peak Hour

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	SWL	SWT	SWR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Total Lost time (s)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00	1.00	1.00
Satd. Flow (prot)	1593	1335	1335	1593	1335	1335	2779	1253	1690	1690	1690
Flt Permitted	0.95	1.00	1.00	1.00	1.00	1.00	0.80	1.00	1.00	1.00	1.00
Satd. Flow (perm)	1593	1335	1335	1593	1335	1335	2247	1253	1690	1690	1690
Volume (vph)	15	732	25	0	0	0	35	190	430	0	360
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	17	851	29	0	0	0	41	221	500	0	419
RTOR Reduction (vph)	0	1	0	0	0	0	0	0	87	0	1
Lane Group Flow (vph)	17	879	0	0	0	0	0	262	413	0	424
Heavy Vehicles (%)	2%	2%	2%	0%	0%	0%	16%	16%	16%	1%	1%
Parking (#/hr)	20	20	20	20	20	20	20	20	20	20	20
Turn Type	Split	2	2	2	2	2	Perm	Perm	1	1	1
Protected Phases	2	2	2	2	2	2	1	1	1	1	1
Permitted Phases	53.0	53.0	53.0	53.0	53.0	53.0	37.0	37.0	37.0	37.0	37.0
Actuated Green, G (s)	55.0	55.0	55.0	55.0	55.0	55.0	39.0	39.0	39.0	39.0	39.0
Effective Green, g (s)	0.55	0.55	0.55	0.55	0.55	0.55	0.39	0.39	0.39	0.39	0.39
Actuated g/C Ratio	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Clearance Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Vehicle Extension (s)	876	734	0.01	c0.66	0.01	c0.66	876	489	c0.33	0.25	0.25
Lane Grp Cap (vph)	0.02	1.20	10.2	22.5	22.5	22.5	0.12	0.30	0.85	0.64	0.64
v/s Ratio Prot	0.62	0.74	0.62	0.74	0.62	0.74	1.00	1.00	1.00	1.00	1.00
v/c Ratio	0.02	1.20	10.2	22.5	22.5	22.5	0.12	0.30	0.85	0.64	0.64
Uniform Delay, d1	0.62	0.74	0.62	0.74	0.62	0.74	1.00	1.00	1.00	1.00	1.00
Progression Factor	0.0	100.4	6.4	117.1	117.1	117.1	21.9	44.1	29.6	29.6	29.6
Incremental Delay, d2	A	F	A	F	F	F	C	D	C	C	C
Delay (s)	115.0	F	115.0	F	F	F	36.5	D	29.6	29.6	29.6
Level of Service	F	F	F	F	F	F	A	D	C	C	C
Approach Delay (s)	F	F	F	F	F	F	A	D	C	C	C
Approach LOS	F	F	F	F	F	F	A	D	C	C	C
Intersection Summary											
HCM Average Control Delay	68.9										
HCM Volume to Capacity ratio	1.05										
Actuated Cycle Length (s)	100.0										
Intersection Capacity Utilization	85.7%										
Analysis Period (min)	15										
c Critical Lane Group											

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HCM Unsignalized Intersection Capacity Analysis  
 25: Harrison St & Site Access

2010 With-Project Conditions - AM Peak Hour

500 Fifth Avenue North



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	Free	Free	Free	Free	Stop	Stop
Sign Control	Free	Free	Free	Free	Stop	Stop
Grade	0%	0%	0%	0%	0%	0%
Volume (veh/h)	0	15	593	342	0	3
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	16	645	372	0	3
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage (veh)						
Upstream signal (ft)		155				
pX, platoon unblocked						
VC, conflicting volume	1016				847	401
VC1, stage 1 conf vol						
VC2, stage 2 conf vol						
VCu, unblocked vol	1016				847	401
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	99
cM capacity (veh/h)	678				301	599
Direction, Lane #	EB 1	WB 1	WB 2	WB 3	SB 1	SB 1
Volume Total	16	258	258	501	3	3
Volume Left	0	0	0	0	0	0
Volume Right	0	0	0	372	3	3
cSH	1700	1700	1700	1700	599	
Volume to Capacity	0.01	0.15	0.15	0.29	0.01	
Queue Length 95th (ft)	0	0	0	0	0	
Control Delay (s)	0.0	0.0	0.0	0.0	11.0	
Lane LOS					B	
Approach Delay (s)	0.0	0.0			11.0	
Approach LOS					B	
Intersection Summary						
Average Delay				0.0		
Intersection Capacity Utilization				29.1%		
ICU Level of Service				A		
Analysis Period (min)				15		

HCM Unsignalized Intersection Capacity Analysis  
 26: Mercer St & Site Driveway

2010 With-Project Conditions - AM Peak Hour

500 Fifth Avenue North



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	Free	Free	Free	Free	Stop	Stop
Sign Control	Free	Free	Free	Free	Stop	Stop
Grade	0%	0%	0%	0%	0%	0%
Volume (veh/h)	1453	63	0	0	0	24
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	1614	70	0	0	0	27
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage (veh)						
Upstream signal (ft)		634			656	
pX, platoon unblocked						
VC, conflicting volume			1684		1649	439
VC1, stage 1 conf vol						
VC2, stage 2 conf vol						
VCu, unblocked vol			1684		1649	439
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	95
cM capacity (veh/h)			376		90	566
Direction, Lane #	EB 1	EB 2	EB 3	EB 4	NB 1	NB 1
Volume Total	461	461	461	301	27	
Volume Left	0	0	0	0	0	
Volume Right	0	0	0	70	27	
cSH	1700	1700	1700	1700	566	
Volume to Capacity	0.27	0.27	0.27	0.18	0.05	
Queue Length 95th (ft)	0	0	0	0	4	
Control Delay (s)	0.0	0.0	0.0	0.0	11.7	
Lane LOS					B	
Approach Delay (s)	0.0				11.7	
Approach LOS					B	
Intersection Summary						
Average Delay				0.2		
Intersection Capacity Utilization				32.1%		
ICU Level of Service				A		
Analysis Period (min)				15		

# HCM Signalized Intersection Capacity Analysis

1: Roy St & 5th Ave

500 Fifth Avenue North  
2010 With-Project Conditions - PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	11	12	11	11	12	11	11	12
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.99	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	0.99	0.99	1.00	0.99	1.00	1.00	1.00	1.00
Flpb, ped/bikes	0.99	0.99	0.99	0.99	1.00	0.97	1.00	0.96	1.00	1.00	1.00	1.00
Flt Protected	0.98	0.98	0.98	0.95	0.99	0.95	1.00	0.95	1.00	1.00	1.00	1.00
Satd. Flow (prot)	1378	1641	1415	1646	1416	1416	1646	1416	1416	1416	1416	1416
Fit Permitted	0.98	0.98	0.95	0.99	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	1378	1641	1415	1646	1416	1416	1646	1416	1416	1416	1416	1416
Volume (vph)	0	0	0	39	55	5	624	320	83	10	185	65
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	42	60	5	678	348	90	11	201	71
RTOR Reduction (vph)	0	0	0	0	2	0	0	9	0	0	16	0
Lane Group Flow (vph)	0	0	0	105	0	594	513	0	11	256	0	20
Confl. Peds. (#/hr)	20	20	20	20	20	20	20	20	20	20	20	20
Heavy Vehicles (%)	0%	0%	0%	2%	2%	2%	1%	1%	1%	6%	6%	6%
Parking (#/hr)	20	20	20	20	20	20	20	20	20	20	20	20
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Split	Split	Split	Split	Split	Split
Protected Phases	6	6	6	6	6	6	4	4	4	4	4	4
Permitted Phases	6	6	6	6	6	6	4	4	4	4	4	4
Actuated Green, G (s)	17.0	17.0	17.0	27.0	27.0	27.0	18.0	18.0	18.0	18.0	18.0	18.0
Effective Green, g (s)	20.0	20.0	20.0	30.0	30.0	30.0	21.0	21.0	21.0	21.0	21.0	21.0
Actuated g/C Ratio	0.25	0.25	0.25	0.38	0.38	0.38	0.26	0.26	0.26	0.26	0.26	0.26
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lane Grp Cap (vph)	345	345	345	615	531	432	432	372	432	372	432	372
v/s Ratio Prot	0.08	0.08	0.08	0.36	c0.36	0.01	c0.18	c0.18	c0.18	c0.18	c0.18	c0.18
v/s Ratio Perm	0.30	0.30	0.30	0.97	0.97	0.03	0.69	0.69	0.69	0.69	0.69	0.69
Uniform Delay, d1	24.3	24.3	24.3	24.5	24.5	24.5	21.9	26.5	21.9	26.5	21.9	26.5
Progression Factor	1.00	1.00	1.00	0.20	0.20	0.20	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.3	2.3	2.3	15.3	16.8	0.1	9.9	9.9	0.1	9.9	0.1	9.9
Delay (s)	26.5	26.5	26.5	20.3	21.7	22.0	36.5	36.5	22.0	36.5	22.0	36.5
Level of Service	C	C	C	C	C	C	D	D	C	D	C	D
Approach Delay (s)	0.0	0.0	0.0	20.9	20.9	20.9	35.9	35.9	20.9	35.9	20.9	35.9
Approach LOS	A	A	A	C	C	C	D	D	C	D	C	D
Intersection Summary												
HCM Average Control Delay	24.2	24.2	24.2	HCM Level of Service			C					
HCM Volume to Capacity ratio	0.70	0.70	0.70									
Actuated Cycle Length (s)	80.0	80.0	80.0	Sum of lost time (s)			9.0					
Intersection Capacity Utilization	63.4%	63.4%	63.4%	ICU Level of Service			B					
Analysis Period (min)	15	15	15									
c Critical Lane Group												

# HCM Signalized Intersection Capacity Analysis

2: Broad St & 9th Ave

500 Fifth Avenue North  
2010 With-Project Conditions - PM Peak Hour

Movement	EBT	EBR	WBL	WBT	WBR	SBL	SBT	SBR	SBR2
Lane Configurations									
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	10	10	11	12	9	8	12
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	0.91	0.91	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.93	1.00	0.99	1.00	0.99	1.00	0.85	1.00	1.00
Satd. Flow (prot)	2928	1507	2997	3847	1247	3847	1247	3847	1247
Fit Permitted	1.00	0.27	1.00	0.99	1.00	0.99	1.00	0.99	1.00
Satd. Flow (perm)	2928	424	2997	3847	1247	3847	1247	3847	1247
Volume (vph)	335	275	160	1585	135	140	945	209	5
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	345	284	165	1634	139	144	974	215	5
RTOR Reduction (vph)	121	0	0	0	0	0	0	1	0
Lane Group Flow (vph)	508	0	165	1773	0	0	1118	219	0
Confl. Peds. (#/hr)	50	50	50	50	50	50	50	50	50
Heavy Vehicles (%)	0%	0%	0%	0%	0%	1%	1%	1%	1%
Bus Blockages (#/hr)	0	0	0	0	0	0	2	0	0
Parking (#/hr)	20	20	20	20	20	20	20	20	20
Turn Type	pm+pt	pm+pt	pm+pt	pm+pt	pm+pt	pm+pt	pm+pt	pm+pt	pm+pt
Protected Phases	1	2	1	2	3	3	3	3	3
Permitted Phases	1	2	1	2	3	3	3	3	3
Actuated Green, G (s)	38.5	63.5	69.5	69.5	38.5	38.5	38.5	38.5	38.5
Effective Green, g (s)	41.5	69.5	72.5	72.5	41.5	41.5	41.5	41.5	41.5
Actuated g/C Ratio	0.35	0.58	0.60	0.60	0.35	0.35	0.35	0.35	0.35
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1013	498	1811	1811	1330	431	431	431	431
v/s Ratio Prot	0.17	0.08	c0.59	c0.59	0.17	0.17	0.17	0.17	0.17
v/s Ratio Perm	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11
v/c Ratio	0.50	0.33	0.98	0.98	0.84	0.84	0.84	0.84	0.84
Uniform Delay, d1	31.1	23.7	23.0	23.0	36.2	31.2	31.2	31.2	31.2
Progression Factor	1.00	0.28	0.32	0.32	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.8	0.1	7.9	7.9	5.0	0.9	0.9	0.9	0.9
Delay (s)	32.8	6.8	15.3	15.3	41.2	32.1	32.1	32.1	32.1
Level of Service	C	A	B	B	D	D	D	D	D
Approach Delay (s)	32.8	14.6	39.7	39.7	32.8	32.8	32.8	32.8	32.8
Approach LOS	C	B	D	D	C	C	C	C	C
Intersection Summary									
HCM Average Control Delay	26.1	26.1	HCM Level of Service				C		
HCM Volume to Capacity ratio	0.93	0.93							
Actuated Cycle Length (s)	120.0	120.0	Sum of lost time (s)				6.0		
Intersection Capacity Utilization	83.6%	83.6%	ICU Level of Service				E		
Analysis Period (min)	15	15							
c Critical Lane Group									

### HCM Signalized Intersection Capacity Analysis

3: Broad St & Westlake Ave

2010 With-Project Conditions - PM Peak Hour

500 Fifth Avenue North  
2010 With-Project Conditions - PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	12	12	10	12	12	10	12	12	12	12
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	0.98	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00
Frpb, ped/bikes	0.98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.98	1.00	1.00	1.00	0.85	1.00	0.95	1.00	0.94	1.00	1.00	1.00
Flt	1.00	0.95	1.00	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00
Satd. Flow (prot)	2983	1624	3032	1454	1526	2818	1624	1710	1624	1710	1624	1710
Flt Permitted	0.82	0.43	1.00	1.00	0.45	1.00	0.45	1.00	0.45	1.00	0.45	1.00
Satd. Flow (perm)	2442	734	3032	1454	716	2818	180	1710	180	1710	180	1710
Volume (vph)	15	410	70	80	1760	1045	160	669	463	35	235	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	16	432	74	84	1853	1100	168	704	487	37	247	0
RTOR Reduction (vph)	0	11	0	0	0	21	0	105	0	0	0	0
Lane Group Flow (vph)	0	511	0	84	1853	1079	168	1086	0	37	247	0
Conf. Peds. (#/hr)	50	50	50	50	50	50	50	50	50	50	50	50
Heavy Vehicles (%)	1%	1%	1%	0%	0%	0%	1%	1%	1%	0%	0%	0%
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	2	2	2	2	2	2	1	1	1	1	1	1
Permitted Phases	2	2	2	2	2	2	1	1	1	1	1	1
Actuated Green, G (s)	73.5	73.5	73.5	73.5	73.5	73.5	35.5	35.5	35.5	35.5	35.5	35.5
Effective Green, g (s)	76.0	76.0	76.0	76.0	76.0	76.0	38.0	38.0	38.0	38.0	38.0	38.0
Actuated g/C Ratio	0.63	0.63	0.63	0.63	0.63	0.63	0.32	0.32	0.32	0.32	0.32	0.32
Clearance Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1547	465	1920	921	227	892	57	542	57	542	57	542
v/s Ratio Prot	0.21	0.11	0.11	0.74	0.23	0.61	0.39	0.21	0.39	0.21	0.39	0.21
v/c Ratio	0.33	0.18	0.97	1.17	0.74	1.22	0.65	0.46	0.65	0.46	0.65	0.46
Uniform Delay, d1	10.2	9.1	20.7	22.0	36.6	41.0	35.3	32.7	35.3	32.7	35.3	32.7
Progression Factor	0.63	0.87	0.67	0.67	0.62	0.52	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1	0.1	10.2	85.8	2.0	99.1	45.4	2.7	45.4	2.7	45.4	2.7
Delay (s)	6.6	8.1	24.1	100.6	24.6	120.4	80.6	35.5	80.6	35.5	80.6	35.5
Level of Service	A	A	C	F	C	F	F	F	F	F	F	D
Approach Delay (s)	6.6	51.4	51.4	108.6	108.6	108.6	41.4	41.4	41.4	41.4	41.4	41.4
Approach LOS	A	D	D	D	D	D	F	F	F	F	D	D
Intersection Summary												
HCM Average Control Delay	61.3						HCM Level of Service					
HCM Volume to Capacity ratio	1.19						E					
Actuated Cycle Length (s)	120.0						Sum of lost time (s)					
Intersection Capacity Utilization	135.1%						ICU Level of Service					
Analysis Period (min)	15						H					
Critical Lane Group												

### HCM Signalized Intersection Capacity Analysis

4: Valley St & Fairview Ave

500 Fifth Avenue North  
2010 With-Project Conditions - PM Peak Hour

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔↔	↗	↗	↔↔	↖↖↖	↗
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	10	12	12	12	12	12
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	1.00	1.00	0.95	0.94	1.00
Fit	1.00	0.85	1.00	1.00	1.00	0.85
Fit Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3002	1151	812	3217	4536	1439
Fit Permitted	1.00	1.00	0.20	1.00	0.95	1.00
Satd. Flow (perm)	3002	1151	171	3217	4536	1439
Volume (vph)	738	50	5	914	1881	350
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	753	51	5	933	1919	357
RTOR Reduction (vph)	0	12	0	0	0	25
Lane Group Flow (vph)	753	39	5	933	1919	332
Heavy Vehicles (%)	1%	1%	100%	1%	1%	1%
Parking (#/hr)	20					
Turn Type	Perm D,P+P pt+ov					
Protected Phases	4	3 3 4			2	2 3
Permitted Phases	4 4					
Actuated Green, G (s)	40.0	40.0	49.0	54.0	56.0	70.0
Effective Green, g (s)	42.0	42.0	53.0	56.0	58.0	72.0
Actuated g/C Ratio	0.35	0.35	0.44	0.47	0.48	0.60
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1051	403	134	1501	2192	863
v/s Ratio Prot	c0.25	0.00 c0.29 c0.42			0.23	
v/s Ratio Perm	0.03 0.01					
v/c Ratio	0.72	0.10	0.04	0.62	0.88	0.38
Uniform Delay, d1	33.8	26.2	20.4	24.0	27.8	12.5
Progression Factor	1.25	1.43	1.00	1.00	1.01	1.01
Incremental Delay, d2	3.0	0.3	0.1	0.8	0.5	0.0
Delay (s)	45.3	37.9	20.5	24.8	28.4	12.6
Level of Service	D	D	C	C	C	B
Approach Delay (s)	44.8 24.8 26.0					
Approach LOS	D C C					
Intersection Summary						
HCM Average Control Delay	29.5					HCM Level of Service C
HCM Volume to Capacity ratio	0.79					
Actuated Cycle Length (s)	120.0					Sum of lost time (s) 9.0
Intersection Capacity Utilization	74.5%					ICU Level of Service D
Analysis Period (min)	15					
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis  
5: Mercer St & 1st Avenue

2010 With-Project Conditions - PM Peak Hour

500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4↑↑						4↑↑					
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0						3.0					
Lane Util. Factor	0.95						1.00	0.95				
Flt Protected	1.00						0.95	1.00				
Satd. Flow (prot)	3525						1736	3241				
Flt Permitted	1.00						0.95	1.00				
Satd. Flow (perm)	3525						1736	3241				
Volume (vph)	95	1094	0	0	0	0	0	150	410	325	0	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	100	1152	0	0	0	0	0	158	432	342	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	20	0	0	0
Lane Group Flow (vph)	0	1252	0	0	0	0	0	158	754	0	0	0
Heavy Vehicles (%)	2%	2%	2%	0%	0%	0%	0%	4%	4%	4%	0%	0%
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	1							2				
Actuated Green, G (s)	36.0							36.0	36.0			
Effective Green, g (s)	37.0							37.0	37.0			
Actuated g/C Ratio	0.46							0.46	0.46			
Clearance Time (s)	4.0							4.0	4.0			
Lane Grp Cap (vph)	1630							803	1499			
v/s Ratio Prot								c0.23				
v/s Ratio Perm	0.36							0.09				
Uniform Delay, d1	0.77							0.20	0.50			
Progression Factor	1.00							1.00	1.00			
Incremental Delay, d2	3.5							0.5	1.2			
Delay (s)	21.5							13.3	16.3			
Level of Service	C							B	B			
Approach Delay (s)	21.5							0.0	15.8			0.0
Approach LOS	C							A	B			A
Intersection Summary												
HCM Average Control Delay								19.0	HCM Level of Service		B	
HCM Volume to Capacity ratio								0.64				
Actuated Cycle Length (s)								80.0	Sum of lost time (s)		6.0	
Intersection Capacity Utilization								61.4%	ICU Level of Service		B	
Analysis Period (min)								15				
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis  
6: Mercer St & 5th Ave

2010 With-Project Conditions - PM Peak Hour

500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4↑↑↑						4↑↑					
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	12	11	11	12	12	12	12	11	11	11	11	12
Lane Width	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.86	1.00					0.91	0.91	0.91	0.91	0.91	0.91
Fltp, ped/bikes	1.00	0.92					1.00	0.95	1.00	1.00	1.00	1.00
Fltp, ped/bikes	1.00	1.00					1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	1.00	0.85					1.00	0.85	1.00	1.00	0.95	0.99
Satd. Flow (prot)	5874	1421					3190	1335	1527	2843		
Flt Permitted	1.00	1.00					1.00	1.00	1.00	0.12	0.69	
Satd. Flow (perm)	5874	1421					3190	1335	201	1992		
Volume (vph)	60	1233	166	0	0	0	0	1017	425	116	153	0
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	64	1312	177	0	0	0	0	1082	452	123	163	0
RTOR Reduction (vph)	0	0	60	0	0	0	0	0	172	0	0	0
Lane Group Flow (vph)	0	1376	117	0	0	0	0	1082	280	62	224	0
Confl. Peds. (#/hr)	30		35	35			30	95	25	25	95	95
Heavy Vehicles (%)	1%	1%	1%	0%	0%	0%	1%	1%	1%	4%	4%	4%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	18	0
Parking (#/hr)	25	25									8	
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	pm+pt		
Protected Phases	2							8		7	4	
Permitted Phases	2		2						8	4		
Actuated Green, G (s)	22.0	22.0						26.0	26.0	46.0	46.0	
Effective Green, g (s)	25.0	25.0						29.0	29.0	49.0	49.0	
Actuated g/C Ratio	0.31	0.31						0.36	0.36	0.61	0.61	
Clearance Time (s)	6.0	6.0						6.0	6.0	6.0	6.0	
Lane Grp Cap (vph)	1836	444						1156	484	405	1401	
v/s Ratio Prot								c0.34		0.03	c0.03	
v/s Ratio Perm	0.23	0.08						0.21	0.06	0.06		
v/c Ratio	0.75	0.26						0.94	0.58	0.15	0.16	
Uniform Delay, d1	24.7	20.6						24.6	20.6	19.5	6.7	
Progression Factor	0.73	0.47						1.06	1.28	2.55	2.80	
Incremental Delay, d2	2.1	1.0						13.9	4.5	0.7	0.2	
Delay (s)	20.2	10.7						40.0	30.8	50.5	18.8	
Level of Service	C	B						D	C	D	B	
Approach Delay (s)	19.1							37.3		25.7		
Approach LOS	B							D		C		
Intersection Summary												
HCM Average Control Delay								27.9	HCM Level of Service		C	
HCM Volume to Capacity ratio								0.66				
Actuated Cycle Length (s)								80.0	Sum of lost time (s)		6.0	
Intersection Capacity Utilization								75.8%	ICU Level of Service		D	
Analysis Period (min)								15				
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis  
7: Mercer St & Dexter Avenue

2010 With-Project Conditions - PM Peak Hour

500 Fifth Avenue North



Movement	EBL	EBT	EBR	WBR	NBT	NBR	SBL	SBT	NEL	NER	NER2
Lane Configurations	4TTL	4TTL			4TTL	4TTL	4TTL	4TTL	4TTL	4TTL	4TTL
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	10	11	10	12	12	12	12
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.86	1.00	0.95	1.00	1.00	1.00	1.00	0.95	1.00	0.95	0.95
Flt	1.00	0.86	1.00	0.85	1.00	1.00	1.00	0.87	0.85	0.85	0.85
Flt Protected	0.99	1.00	1.00	1.00	0.95	1.00	0.95	1.00	0.99	1.00	1.00
Satd. Flow (prot)	5761	1479	3032	1405	1501	3217	1478	1381	1478	1381	1381
Flt Permitted	0.99	1.00	1.00	1.00	0.18	1.00	0.99	1.00	0.99	1.00	1.00
Satd. Flow (perm)	5761	1479	3032	1405	278	3217	1478	1381	1478	1381	1381
Volume (vph)	332	1818	50	100	460	155	285	440	25	315	10
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	373	2043	56	112	517	174	320	494	28	354	11
RTOR Reduction (vph)	0	0	0	58	0	10	0	0	0	2	0
Lane Group Flow (vph)	0	2472	0	54	517	164	320	494	210	181	0
Heavy Vehicles (%)	1%	1%	1%	0%	0%	0%	1%	1%	0%	0%	0%
Turn Type	Perm	1	custom	perm	perm	perm	perm	perm	Perm	Perm	Perm
Protected Phases	1	1	4	4	4	4	7	2	2	2	2
Permitted Phases	1	1	4	4	4	4	7	2	2	2	2
Actuated Green, G (s)	64.0	64.0	26.0	26.0	44.0	44.0	44.0	14.0	14.0	14.0	14.0
Effective Green, g (s)	67.0	67.0	29.0	29.0	47.0	47.0	47.0	17.0	17.0	17.0	17.0
Actuated g/C Ratio	0.48	0.48	0.21	0.21	0.34	0.34	0.34	0.12	0.12	0.12	0.12
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lane Grp Cap (vph)	2757	708	628	291	224	1080	179	168	179	168	168
v/s Ratio Prot	0.04	0.17	c0.15	c0.15	0.15	c0.14	0.13	0.13	0.13	0.13	0.13
v/s Ratio Perm	0.43	0.90	0.82	0.56	1.43	0.46	1.17	1.08	1.08	1.08	1.08
v/c Ratio	33.3	19.7	53.1	49.8	39.9	36.5	61.5	61.5	61.5	61.5	61.5
Uniform Delay, d1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	5.1	0.2	11.6	7.7	216.7	1.4	121.6	92.0	92.0	92.0	92.0
Delay (s)	38.4	20.0	64.7	57.5	256.6	37.9	183.1	153.5	153.5	153.5	153.5
Level of Service	D	B	E	E	F	D	F	F	F	F	F
Approach Delay (s)	38.4	62.9	123.9	169.3	169.3	169.3	169.3	169.3	169.3	169.3	169.3
Approach LOS	D	E	F	F	F	F	F	F	F	F	F

Intersection Summary			
HCM Average Control Delay	68.7	HCM Level of Service	E
HCM Volume to Capacity ratio	1.12		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	95.7%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis  
8: Mercer St & 9th Ave

2010 With-Project Conditions - PM Peak Hour

500 Fifth Avenue North



Movement	EBT	EBR	SBL	SBT	SBR	SER
Lane Configurations	4TTL	4TTL	4TTL	4TTL	4TTL	4TTL
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	9	12	11
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.86	1.00	0.91	0.91	0.91	0.91
Flt	1.00	1.00	0.88	0.94	0.94	0.94
Flt Protected	1.00	1.00	1.00	0.98	0.98	0.98
Satd. Flow (prot)	5617	1288	2495	2495	2495	2495
Flt Permitted	1.00	0.95	0.98	0.98	0.98	0.98
Satd. Flow (perm)	5617	1288	2495	2495	2495	2495
Volume (vph)	2273	35	705	285	80	0
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	2319	36	719	291	82	0
RTOR Reduction (vph)	2	0	3	3	0	0
Lane Group Flow (vph)	2353	0	357	729	0	0
Conf. Peds. (#/hr)	1%	1%	1%	1%	1%	1%
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%
Bus Blockages (#/hr)	0	0	0	2	0	0
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	1	2	2	2	2	2
Permitted Phases	1	2	2	2	2	2
Actuated Green, G (s)	69.9	39.1	39.1	39.1	39.1	39.1
Effective Green, g (s)	72.4	41.6	41.6	41.6	41.6	41.6
Actuated g/C Ratio	0.60	0.35	0.35	0.35	0.35	0.35
Clearance Time (s)	5.5	5.5	5.5	5.5	5.5	5.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	3389	447	865	865	865	865
v/s Ratio Prot	c0.42	0.28	0.29	0.29	0.29	0.29
v/s Ratio Perm	0.69	0.80	0.84	0.84	0.84	0.84
Uniform Delay, d1	16.2	35.4	36.2	36.2	36.2	36.2
Progression Factor	1.00	1.44	1.44	1.44	1.44	1.44
Incremental Delay, d2	1.2	6.7	5.2	5.2	5.2	5.2
Delay (s)	17.4	57.7	57.3	57.3	57.3	57.3
Level of Service	B	E	E	E	E	E
Approach Delay (s)	17.4	57.4	57.4	57.4	57.4	57.4
Approach LOS	B	E	E	E	E	E

Intersection Summary			
HCM Average Control Delay	30.1	HCM Level of Service	
HCM Volume to Capacity ratio	0.75	C	
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	
Intersection Capacity Utilization	66.8%	ICU Level of Service	
Analysis Period (min)	15	C	
! Phase conflict between lane groups.			

HCM Signalized Intersection Capacity Analysis  
9: Mercer St & Westlake Ave

2010 With-Project Conditions - PM Peak Hour

500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Diagram												
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	12	11	12	12	12	12	12	11	12	12	12	12
Lane Width	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Total Lost time (s)	0.86											
Lane Util. Factor	1.00	0.91	0.91	1.00	1.00	1.00	1.00	0.99	0.85	1.00	1.00	1.00
Flt Protected	1.00							1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	5603							2952	1310	1624	1710	
Flt Permitted	1.00							1.00	1.00	0.95	1.00	
Satd. Flow (perm)	5603							2952	1310	1624	1710	
Volume (vph)	257	2701	10	0	0	0	0	1070	605	230	95	0
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	260	2728	10	0	0	0	0	1081	611	232	96	0
RTOR Reduction (vph)	0	1	0	0	0	0	0	4	33	0	0	0
Lane Group Flow (vph)	0	2997	0	0	0	0	0	1146	509	232	96	0
Heavy Vehicles (%)	1%	1%	1%	0%	0%	0%	1%	1%	1%	0%	0%	0%
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4							6		5	2	
Permitted Phases	4							6				
Actuated Green, G (s)	47.5							38.0	38.0	18.0	61.5	
Effective Green, g (s)	50.0							40.5	40.5	20.5	64.0	
Actuated g/C Ratio	0.42							0.34	0.34	0.17	0.53	
Clearance Time (s)	5.5							5.5	5.5	5.5	5.5	
Vehicle Extension (s)	3.0							3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	2335							996	442	277	912	
v/s Ratio Prot								0.39		c0.14	0.06	
v/s Ratio Perm	0.53							1.15	1.15	0.84	0.11	
v/c Ratio	1.28							39.8	39.8	48.1	13.8	
Uniform Delay, d1	35.0							1.00	1.00	1.27	0.75	
Progression Factor	0.79							79.2	90.7	23.8	0.2	
Incremental Delay, d2	130.0							118.9	130.3	85.2	10.7	
Delay (s)	157.7							F	F	F	B	
Level of Service	F							F	F	F	B	
Approach Delay (s)	157.7				0.0			122.5			63.4	
Approach LOS	F				A			F			E	
<b>Intersection Summary</b>												
HCM Average Control Delay	139.7										F	
HCM Volume to Capacity ratio	1.15											
Actuated Cycle Length (s)	120.0										9.0	
Intersection Capacity Utilization	112.2%										H	
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis  
10: Mercer St & Fairview Ave

2010 With-Project Conditions - PM Peak Hour

500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBR	NBL	NBT	NBR	NBR2	SBT
Diagram										
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	12	11	12	12	12	12	10	12	12	12
Lane Width	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Total Lost time (s)	0.91									
Lane Util. Factor	1.00	0.85	1.00	0.85	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	1.00	1.00								
Satd. Flow (prot)	4512	1454								
Flt Permitted	1.00	1.00								
Satd. Flow (perm)	4512	1454								
Volume (vph)	5	3506	330	70	425	2011	300	1310	10	65
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	5	3614	340	72	438	2073	309	1351	10	67
RTOR Reduction (vph)	0	0	6	0	0	63	0	1	0	0
Lane Group Flow (vph)	0	3619	406	0	438	2010	309	1360	0	67
Heavy Vehicles (%)	0%	0%	0%	0%	1%	1%	0%	0%	0%	6%
Turn Type	Split	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	1	1	1	1	1	1	1	1	1	1
Permitted Phases	1									
Actuated Green, G (s)	69.5	69.5								
Effective Green, g (s)	72.0	72.0								
Actuated g/C Ratio	0.60	0.60								
Clearance Time (s)	5.5	5.5								
Vehicle Extension (s)	3.0	3.0								
Lane Grp Cap (vph)	2707	872								
v/s Ratio Prot	c0.80	0.28								
v/s Ratio Perm	1.34	0.47								
v/c Ratio	24.0	13.3								
Uniform Delay, d1	0.41	0.38								
Progression Factor	151.8	0.2								
Incremental Delay, d2	161.6	5.3								
Delay (s)	F	A								
Level of Service	F	A								
Approach Delay (s)	145.7									
Approach LOS	F									
<b>Intersection Summary</b>										
HCM Average Control Delay	140.7									
HCM Volume to Capacity ratio	1.40									
Actuated Cycle Length (s)	120.0									
Intersection Capacity Utilization	181.1%									
Analysis Period (min)	15									
c Critical Lane Group										



# HCM Signalized Intersection Capacity Analysis 11: Republican St & 5th Ave

500 Fifth Avenue North  
2010 With-Project Conditions - PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	11	11	11	11	12	11	11	12
Total Lost time (s)				3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Util. Factor				0.95	0.95	1.00	0.91	1.00		1.00	0.95	
Frpb, ped/bikes				1.00	0.98	1.00	1.00			1.00	0.99	
Flpb, ped/bikes				0.98	1.00	0.86	1.00			1.00	1.00	
Flt				1.00	0.85	1.00	0.99			1.00	1.00	
Flt Protected				0.95	1.00	0.95	1.00			0.95	1.00	
Satd. Flow (prot)				1624	1448	1472	4883			1673	3314	
Flt Permitted				0.95	1.00	0.54	1.00			0.14	1.00	
Satd. Flow (perm)				1624	1448	832	4883			242	3314	
Volume (vph)	0	0	0	318	5	147	20	1305	46	14	315	10
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	0	0	0	342	5	158	22	1403	49	15	339	11
RTOR Reduction (vph)	0	0	0	0	0	28	0	4	0	0	3	0
Lane Group Flow (vph)	0	0	0	347	130	22	1448	0	15	347	0	0
Confl. Peds. (#/hr)	10	20	20	20	10	75	20	20	20	20	75	75
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	2%	2%	2%	4%	4%	4%
Parking (#/hr)	8											
Turn Type	Perm Perm Perm Perm Perm Perm Perm Perm Perm Perm Perm Perm											
Protected Phases	6 6 6 8 8 8 8 8 8 8 8 8											
Permitted Phases	6 6 6 8 8 8 8 8 8 8 8 8											
Actuated Green, G (s)	22.2 22.2 46.8 46.8 46.8 46.8 46.8 46.8 46.8 46.8 46.8											
Effective Green, g (s)	24.2 24.2 49.8 49.8 49.8 49.8 49.8 49.8 49.8 49.8 49.8											
Actuated g/C Ratio	0.30 0.30 0.62 0.62 0.62 0.62 0.62 0.62 0.62 0.62 0.62											
Clearance Time (s)	5.0 5.0 6.0 6.0 6.0 6.0 6.0 6.0 6.0 6.0 6.0											
Vehicle Extension (s)	3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0											
Lane Grp Cap (vph)	491 438 518 3040 151 2063											
v/s Ratio Prot	0.21 0.09 0.03											
v/s Ratio Perm	0.71 0.30 0.04 0.48 0.10 0.17											
v/c Ratio	24.8 21.4 5.9 8.1 6.1 6.4											
Uniform Delay, d1	1.00 1.00 1.41 1.10 0.87 0.92											
Progression Factor	4.6 0.4 0.1 0.3 1.3 0.2											
Incremental Delay, d2	29.4 21.8 8.4 9.2 6.6 6.0											
Delay (s)	C C C A A A											
Level of Service	C C C A A A											
Approach Delay (s)	0.0 27.0 9.2 9.2 6.1											
Approach LOS	A C C A A A											
Intersection Summary												
HCM Average Control Delay	12.5 HCM Level of Service B											
HCM Volume to Capacity ratio	0.55											
Actuated Cycle Length (s)	80.0 Sum of lost time (s) 6.0											
Intersection Capacity Utilization	60.6% ICU Level of Service B											
Analysis Period (min)	15											
Critical Lane Group												

# HCM Signalized Intersection Capacity Analysis 12: Harrison St & 5th Ave

500 Fifth Avenue North  
2010 With-Project Conditions - PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↶	↷		↶	↷	↶	↶	↷	↶	↷	↶	↷
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	11	11	11	11	12	12	11	12
Total Lost time (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0			3.0	
Lane Util. Factor	1.00	1.00		1.00	0.88	1.00	0.95				0.95	
Frpb, ped/bikes	1.00	0.84		1.00	1.00	1.00	0.99				0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	0.88	1.00				1.00	
Fit	1.00	0.85		1.00	0.85	1.00	1.00				1.00	
Fit Protected	0.95	1.00		0.97	1.00	0.95	1.00				1.00	
Satd. Flow (prot)	1517	1141		1774	2748	1478	3320				3319	
Flt Permitted	0.24	1.00		0.97	1.00	0.23	1.00				0.95	
Satd. Flow (perm)	376	1141		1774	2748	351	3320				3153	
Volume (vph)	15	0	25	25	10	757	25	599	15	5	608	10
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	16	0	27	27	11	832	27	658	16	5	668	11
RTOR Reduction (vph)	0	21	0	0	0	0	0	2	0	0	1	0
Lane Group Flow (vph)	16	6	0	0	38	832	27	672	0	0	683	0
Confl. Peds. (#/hr)	100	100	100	100	185	185	115	115	115	115	185	185
Heavy Vehicles (%)	19%	19%	19%	0%	0%	0%	4%	4%	4%	4%	4%	4%
Turn Type	Perm	Perm	Split	Split	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	2	2	6	6	6	6	8	8	8	8	4	4
Permitted Phases	2	16.0	16.0	27.8	27.8	27.8	22.2	22.2	22.2	22.2	22.2	22.2
Actuated Green, G (s)	16.0	16.0	16.0	27.8	27.8	27.8	22.2	22.2	22.2	22.2	22.2	22.2
Effective Green, g (s)	17.0	17.0	17.0	28.8	28.8	28.8	25.2	25.2	25.2	25.2	25.2	25.2
Actuated g/C Ratio	0.21	0.21	0.21	0.36	0.36	0.36	0.32	0.32	0.32	0.32	0.32	0.32
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	80	242	639	989	989	111	1046	1046	993	993	993	993
v/s Ratio Prot	0.01		0.02	0.02	0.02	0.02	0.20	0.20			0.22	0.22
v/s Ratio Perm	0.04		0.06	0.06	0.06	0.06	0.24	0.24	0.64		0.69	0.69
Uniform Delay, d1	25.9	24.9	16.7	23.5	23.5	20.3	23.5	23.5	24.0		24.0	24.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.44	1.39	1.39	1.57		1.57	1.57
Incremental Delay, d2	1.2	0.0	0.0	0.0	0.0	6.6	4.6	2.7	3.6		3.6	3.6
Delay (s)	27.1	25.0	16.8	30.1	30.1	33.9	35.4	35.4	41.1		41.1	41.1
Level of Service	C	C	B	C	C	C	D	D	D		D	D
Approach Delay (s)	25.8	29.5	29.5	35.4	35.4	41.1			41.1		41.1	41.1
Approach LOS	C	C	C	D	D	D			D		D	D
Intersection Summary												
HCM Average Control Delay	34.7 HCM Level of Service C											
HCM Volume to Capacity ratio	0.63											
Actuated Cycle Length (s)	80.0 Sum of lost time (s) 9.0											
Intersection Capacity Utilization	66.8% ICU Level of Service C											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis  
13: Harrison St & Broad St

2010 With-Project Conditions - PM Peak Hour

500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
Sign Control	0	0	5	0	0	0	0	695	15	0	945	734
Grade	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Volume (veh/h)	0	0	5	0	0	0	0	716	15	0	974	757
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	0	0	5	0	0	0	0	716	15	0	974	757
Pedestrians	20											
Lane Width (ft)	11.0											
Walking Speed (ft/s)	4.0											
Percent Blockage	2											
Right turn flare (veh)												
Median type	None											
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
VC, conflicting volume	1731	2105	885	1211	2475	366	1751					732
VC1, stage 1 conf vol												
VC2, stage 2 conf vol												
vC, unblocked vol	1731	2105	885	1211	2475	366	1751					732
tC, single (s)	7.5	6.5	6.9	7.6	6.6	7.0	4.1					4.1
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.6	4.0	3.4	2.2					2.2
p0 queue free %	100	100	98	100	100	100	100					100
cM capacity (veh/h)	56	51	287	131	28	622	353					875
Direction, Lane #	EB 1	NE 1	NE 2	SW 1	SW 2							
Volume Total	5	478	254	649	1081							
Volume Left	0	0	0	0	0							
Volume Right	5	0	15	0	757							
cSH	287	1700	1700	1700	1700							
Volume to Capacity	0.02	0.28	0.15	0.38	0.64							
Queue Length 95th (ft)	1	0	0	0	0							
Control Delay (s)	17.8	0.0	0.0	0.0	0.0							
Lane LOS	C											
Approach Delay (s)	17.8	0.0	0.0									
Approach LOS	C											
Intersection Summary												
Average Delay			0.0									
Intersection Capacity Utilization			60.5%			ICU Level of Service				B		
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis  
14: 5th Ave & Broad St

2010 With-Project Conditions - PM Peak Hour

500 Fifth Avenue North

Movement	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	12	12	11	11	11	11	12	11	11	12
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Frpb, ped/bikes	0.99	1.00	0.85	1.00	1.00	1.00	1.00	1.00	1.00	0.99	1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.98	1.00	0.85	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	0.95
Satd. Flow (prot)	3226	3331	1318	1694	3388	1646	3257					
Fit Permitted	1.00	1.00	1.00	0.95	1.00	0.95	1.00					
Satd. Flow (perm)	3226	3331	1318	1694	3388	1646	3257					
Volume (vph)	0	426	50	0	511	137	188	560	0	125	660	20
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	0	458	54	0	549	147	202	602	0	134	710	22
RTOR Reduction (vph)	0	11	0	0	0	0	0	0	0	0	3	0
Lane Group Flow (vph)	0	501	0	0	549	147	202	602	0	134	729	0
Conf. Peds. (#/hr)	115	85	85	115	130	45	45	130	6%	6%	6%	6%
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	3%	3%	3%	3%
Bus Blockages (#/hr)	0	20	0	0	18	0	0	0	0	0	0	0
Turn Type												
Protected Phases	8	4										
Permitted Phases												
Actuated Green, G (s)	21.0	21.0	14.0	24.0						14.0	24.0	
Effective Green, g (s)	27.0	27.0	17.0	27.0						17.0	27.0	
Actuated g/C Ratio	0.34	0.34	0.21	0.34						0.21	0.34	
Clearance Time (s)	9.0	9.0	6.0	6.0						6.0	6.0	
Lane Grp Cap (vph)	1089	1124	445	360	1143					350	1089	
v/s Ratio Prot	0.16	c0.16		c0.12	0.18					0.08	c0.22	
v/s Ratio Perm		0.11										
v/c Ratio	0.46	0.49	0.33	0.56	0.53					0.38	0.66	
Uniform Delay, d1	20.8	21.0	19.8	28.2	21.4					27.0	22.6	
Progression Factor	0.92	0.10	0.08	1.23	0.83					1.00	1.00	
Incremental Delay, d2	1.4	1.2	1.5	5.7	1.6					3.2	3.2	
Delay (s)	20.5	20.5	3.3	3.2	40.3	19.3				30.2	25.8	
Level of Service	C	A	A	D	B					C	C	
Approach Delay (s)	20.5	3.3		24.6						26.5		
Approach LOS	C	A		C						C		
Intersection Summary												
HCM Average Control Delay			19.3			HCM Level of Service				B		
HCM Volume to Capacity ratio			0.57									
Actuated Cycle Length (s)			80.0			Sum of lost time (s)				9.0		
Intersection Capacity Utilization			56.2%			ICU Level of Service				B		
Analysis Period (min)			15									
c Critical Lane Group												



HCM Signalized Intersection Capacity Analysis  
15: Denny Way & 1st Avenue

2010 With-Project Conditions - PM Peak Hour

500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SBL	SBR	NWL	NWR	NWR2
Lane Configurations	↕	↕		↕	↕	↕		↕	↕	↕	↕
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0			3.0					3.0	3.0	
Lane Util. Factor	0.95			0.91					1.00	0.95	
Flt Protected	0.97			0.97					1.00	0.85	
Satd. Flow (prot)	3354			4874					1718	1461	
Flt Permitted	1.00			1.00					0.95	1.00	
Satd. Flow (perm)	3354			4874					1718	1461	
Volume (vph)	0	1209	350	0	1358	370	0	0	360	310	15
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	0	1286	372	0	1445	394	0	0	383	330	16
RTOR Reduction (vph)	0	27	0	0	49	0	0	0	0	2	0
Lane Group Flow (vph)	0	1631	0	0	1790	0	0	0	394	333	0
Heavy Vehicles (%)	4%	4%	4%	3%	3%	3%	0%	0%	5%	5%	5%
Turn Type	Prot										
Protected Phases	1	1									
Permitted Phases	2										
Actuated Green, G (s)	57.0	57.0									
Effective Green, g (s)	59.0	59.0									
Actuated g/C Ratio	0.59	0.59									
Clearance Time (s)	5.0	5.0									
Lane Grp Cap (vph)	1979	2876									
v/s Ratio Prot	c0.49	0.37									
v/s Ratio Perm	0.23										
v/c Ratio	0.82	0.62									
Uniform Delay, d1	16.4	13.3									
Progression Factor	1.00	0.44									
Incremental Delay, d2	4.1	0.7									
Delay (s)	20.4	6.5									
Level of Service	C	A									
Approach Delay (s)	20.4	6.5									
Approach LOS	C	A									
Intersection Summary											
HCM Average Control Delay	16.6 HCM Level of Service										
HCM Volume to Capacity ratio	0.76										
Actuated Cycle Length (s)	100.0										
Intersection Capacity Utilization	77.8% ICU Level of Service										
Analysis Period (min)	15										
Critical Lane Group											

HCM Signalized Intersection Capacity Analysis  
16: Denny Way & Broad St

2010 With-Project Conditions - PM Peak Hour

500 Fifth Avenue North

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations	↔↔↔↔↔↔↔↔↔↔↔↔											
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	12	12	12	12	10	12	12	10	12	9
Total Lost time (s)	3.0											
Lane Util. Factor	0.95											
Flrb, ped/bikes	1.00											
Flpb, ped/bikes	1.00											
Flt	1.00											
Flt Protected	1.00											
Satd. Flow (prot)	3368											
Flt Permitted	1.00											
Satd. Flow (perm)	3368											
Volume (vph)	0 795 0 0 1410 10 0 523 60 0 519 328											
Peak-hour factor, PHF	0.94 0.94 0.94 0.94 0.94 0.94 0.94 0.94 0.94 0.94 0.94 0.94											
Adj. Flow (vph)	0 846 0 0 1500 11 0 556 64 0 552 349											
RTOR Reduction (vph)	0 0 0 0 0 0 0 9 0 0 0 22											
Lane Group Flow (vph)	0 846 0 0 1511 0 0 611 0 0 552 327											
Confli. Peds. (#/hr)	22 12 12 12 22 18 18 34 34 34 18 18											
Heavy Vehicles (%)	3% 3% 3% 3% 1% 1% 1% 1% 1% 1% 1% 1%											
Bus Blockages (#/hr)	0 3 0 0 23 0 0 0 0 0 0 0											
Turn Type	1 1 1 1 1 1 1 1 1 1 1 1											
Protected Phases	1											
Permitted Phases	1											
Actuated Green, G (s)	58.0											
Effective Green, g (s)	60.0											
Actuated g/C Ratio	0.60											
Clearance Time (s)	5.0											
Lane Grp Cap (vph)	2021 1975 1975 1975 1975 1975 1975 1975 1975 1975 1975 1975											
v/s Ratio Prot	0.25 0.25 0.25 0.25 0.25 0.25 0.25 0.25 0.25 0.25 0.25 0.25											
v/s Ratio Perm	0.42 0.42 0.42 0.42 0.42 0.42 0.42 0.42 0.42 0.42 0.42 0.42											
Uniform Delay, d1	10.7 10.7 10.7 10.7 10.7 10.7 10.7 10.7 10.7 10.7 10.7 10.7											
Progression Factor	2.30 2.30 2.30 2.30 2.30 2.30 2.30 2.30 2.30 2.30 2.30 2.30											
Incremental Delay, d2	0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3											
Delay (s)	24.9 24.9 24.9 24.9 24.9 24.9 24.9 24.9 24.9 24.9 24.9 24.9											
Level of Service	C C C C C C C C C C C C											
Approach Delay (s)	24.9 24.9 24.9 24.9 24.9 24.9 24.9 24.9 24.9 24.9 24.9 24.9											
Approach LOS	C C C C C C C C C C C C											
Intersection Summary												
HCM Average Control Delay	21.7 HCM Level of Service											
HCM Volume to Capacity ratio	0.74											
Actuated Cycle Length (s)	100.0											
Intersection Capacity Utilization	68.0% ICU Level of Service											
Analysis Period (min)	15											
Critical Lane Group												

# HCM Signalized Intersection Capacity Analysis 17: Denny Way & 5th Ave

2010 With-Project Conditions - PM Peak Hour

500 Fifth Avenue North  
2010 With-Project Conditions - PM Peak Hour

Movement	EBT	EBR	EBR2	WBT	WBR	NBL	NBT	NBR	NBR2	SBL2	SBL	SBT
Lane Configurations	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	10	12	12	10	12	12	11	12	13
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Frpb, ped/bikes	0.99	0.99	0.99	1.00	0.99	1.00	1.00	0.99	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.97	0.97	0.97	1.00	0.97	1.00	0.97	1.00	0.99	1.00	0.99	1.00
Satd. Flow (prot)	3272	3272	3200	3200	2957	2957	1752	1875	1752	1875	1875	1875
Flt Permitted	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	3272	3272	3200	3200	2957	2957	1752	1875	1752	1875	1875	1875
Volume (vph)	745	175	15	795	166	5	150	35	10	239	218	110
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	793	186	16	846	177	5	160	37	11	254	232	117
RTOR Reduction (vph)	1	0	0	17	0	0	4	0	0	0	0	4
Lane Group Flow (vph)	994	0	0	1007	0	0	209	0	0	0	486	124
Confl. Peds. (#/hr)	8	23	17	23	17	17	23	17	17	23	17	23
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	6%	6%	6%	3%	3%	3%
Bus Blockages (#/hr)	3	0	0	4	0	0	18	0	0	0	0	0
Turn Type	Protected Phases	1	1	3	3	3	3	3	3	2	2	2
Permitted Phases	Permitted Phases	1	1	3	3	3	3	3	3	2	2	2
Actuated Green, G (s)	48.0	48.0	48.0	48.0	48.0	48.0	12.0	25.0	25.0	25.0	25.0	25.0
Effective Green, g (s)	50.0	50.0	50.0	50.0	50.0	50.0	14.0	27.0	27.0	27.0	27.0	27.0
Actuated g/C Ratio	0.50	0.50	0.50	0.50	0.50	0.50	0.14	0.27	0.27	0.27	0.27	0.27
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1636	1600	1600	1600	1600	1600	414	473	506	473	506	506
v/s Ratio Prot	0.30	0.30	0.31	0.31	0.31	0.31	c0.07	c0.28	0.07	c0.28	0.07	0.07
v/s Ratio Perm	0.61	0.61	0.63	0.63	0.63	0.63	0.50	1.03	0.25	1.03	0.25	0.25
Uniform Delay, d1	18.0	18.0	18.2	18.2	18.2	18.2	39.8	36.5	28.5	36.5	28.5	28.5
Progression Factor	0.16	0.16	0.72	0.72	0.72	0.72	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.3	1.3	1.8	1.8	1.8	1.8	1.0	48.6	0.3	48.6	0.3	0.3
Delay (s)	4.1	4.1	14.9	14.9	14.9	14.9	40.8	85.1	28.8	85.1	28.8	28.8
Level of Service	A	A	B	B	B	B	D	F	C	F	C	C
Approach Delay (s)	4.1	4.1	14.9	14.9	14.9	14.9	40.8	85.1	28.8	85.1	28.8	28.8
Approach LOS	A	A	B	B	B	B	D	F	C	F	C	C
Intersection Summary												
HCM Average Control Delay	25.7											
HCM Volume to Capacity ratio	0.73											
Actuated Cycle Length (s)	100.0											
Intersection Capacity Utilization	68.8%											
Analysis Period (min)	15											
c Critical Lane Group												

Movement	EBT	EBR	EBR2	WBT	WBR	NBL	NBT	NBR	NBR2	SBL2	SBL	SBT
Lane Configurations	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	10	12	12	10	12	12	11	12	13
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Frpb, ped/bikes	0.99	0.99	0.99	1.00	0.99	1.00	1.00	0.99	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.97	0.97	0.97	1.00	0.97	1.00	0.97	1.00	0.99	1.00	0.99	1.00
Satd. Flow (prot)	3272	3272	3200	3200	2957	2957	1752	1875	1752	1875	1875	1875
Flt Permitted	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	3272	3272	3200	3200	2957	2957	1752	1875	1752	1875	1875	1875
Volume (vph)	745	175	15	795	166	5	150	35	10	239	218	110
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	793	186	16	846	177	5	160	37	11	254	232	117
RTOR Reduction (vph)	1	0	0	17	0	0	4	0	0	0	0	4
Lane Group Flow (vph)	994	0	0	1007	0	0	209	0	0	0	486	124
Confl. Peds. (#/hr)	8	23	17	23	17	17	23	17	17	23	17	23
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	6%	6%	6%	3%	3%	3%
Bus Blockages (#/hr)	3	0	0	4	0	0	18	0	0	0	0	0
Turn Type	Protected Phases	1	1	3	3	3	3	3	3	2	2	2
Permitted Phases	Permitted Phases	1	1	3	3	3	3	3	3	2	2	2
Actuated Green, G (s)	48.0	48.0	48.0	48.0	48.0	48.0	12.0	25.0	25.0	25.0	25.0	25.0
Effective Green, g (s)	50.0	50.0	50.0	50.0	50.0	50.0	14.0	27.0	27.0	27.0	27.0	27.0
Actuated g/C Ratio	0.50	0.50	0.50	0.50	0.50	0.50	0.14	0.27	0.27	0.27	0.27	0.27
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1636	1600	1600	1600	1600	1600	414	473	506	473	506	506
v/s Ratio Prot	0.30	0.30	0.31	0.31	0.31	0.31	c0.07	c0.28	0.07	c0.28	0.07	0.07
v/s Ratio Perm	0.61	0.61	0.63	0.63	0.63	0.63	0.50	1.03	0.25	1.03	0.25	0.25
Uniform Delay, d1	18.0	18.0	18.2	18.2	18.2	18.2	39.8	36.5	28.5	36.5	28.5	28.5
Progression Factor	0.16	0.16	0.72	0.72	0.72	0.72	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.3	1.3	1.8	1.8	1.8	1.8	1.0	48.6	0.3	48.6	0.3	0.3
Delay (s)	4.1	4.1	14.9	14.9	14.9	14.9	40.8	85.1	28.8	85.1	28.8	28.8
Level of Service	A	A	B	B	B	B	D	F	C	F	C	C
Approach Delay (s)	4.1	4.1	14.9	14.9	14.9	14.9	40.8	85.1	28.8	85.1	28.8	28.8
Approach LOS	A	A	B	B	B	B	D	F	C	F	C	C
Intersection Summary												
HCM Average Control Delay	25.7											
HCM Volume to Capacity ratio	0.73											
Actuated Cycle Length (s)	100.0											
Intersection Capacity Utilization	68.8%											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis  
18: Denny Way & Aurora Ave

2010 With-Project Conditions - PM Peak Hour

500 Fifth Avenue North

Movement	EBT	EBR	EBR2	WBT	WBR	NBT	NBR	NBR2	SBL2	SBL	SBT	SBR
Lane Configurations	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	11	12	12	12	12	12	12	12	12
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Frt	0.99	0.97	0.98	0.97	0.98	0.97	0.98	0.97	0.98	0.97	0.98	0.95
Flt Protected	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	3086	3086	3155	3155	3155	3155	3155	3155	3155	3155	3155	3155
Flt Permitted	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (perm)	3086	3016	3155	3016	3155	3155	3155	3155	3155	3155	3155	3155
Volume (vph)	1129	55	5	1137	285	1020	145	5	220	70	0	450
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	1152	56	5	1160	291	1041	148	5	224	71	0	459
RTOR Reduction (vph)	0	0	0	22	0	0	0	0	0	0	0	3
Lane Group Flow (vph)	1213	0	0	1429	0	1194	0	0	0	295	239	237
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	4
Turn Type	2	0	0	2	0	4	0	0	0	0	0	8
Protected Phases	2	0	0	2	0	4	0	0	0	0	0	8
Permitted Phases	2	0	0	2	0	4	0	0	0	0	0	8
Actuated Green, G (s)	26.0	26.0	26.0	32.4	32.4	32.4	32.4	32.4	22.6	60.0	60.0	60.0
Effective Green, g (s)	32.0	32.0	32.0	34.4	34.4	34.4	34.4	34.4	24.6	62.0	62.0	62.0
Actuated g/C Ratio	0.32	0.32	0.32	0.34	0.34	0.34	0.34	0.34	0.25	0.62	0.62	0.62
Clearance Time (s)	9.0	9.0	9.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	988	965	1085	965	1085	965	1085	965	392	826	839	839
v/s Ratio Prot	0.39	0.39	0.39	0.47	0.47	0.47	0.47	0.47	0.19	0.18	0.18	0.18
v/s Ratio Perm	1.23	1.23	1.23	1.48	1.48	1.48	1.48	1.48	0.75	0.29	0.28	0.28
Uniform Delay, d1	34.0	34.0	34.0	32.8	32.8	32.8	32.8	32.8	34.9	8.8	8.8	8.8
Progression Factor	0.99	0.99	0.99	0.53	0.53	0.53	0.53	0.53	1.00	1.00	1.00	1.00
Incremental Delay, d2	110.9	110.9	110.9	220.1	220.1	220.1	220.1	220.1	8.0	0.2	0.2	0.2
Delay (s)	144.6	144.6	144.6	238.2	238.2	238.2	238.2	238.2	42.8	9.0	8.9	8.9
Level of Service	F	F	F	F	F	F	F	F	D	A	A	A
Approach Delay (s)	144.6	144.6	144.6	238.2	238.2	238.2	238.2	238.2	21.9	21.9	21.9	21.9
Approach LOS	F	F	F	F	F	F	F	F	C	C	C	C
Intersection Summary												
HCM Average Control Delay	139.9											
HCM Volume to Capacity ratio	1.14											
Actuated Cycle Length (s)	100.0											
Intersection Capacity Utilization	109.5%											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis  
18: Denny Way & Aurora Ave

2010 With-Project Conditions - PM Peak Hour

500 Fifth Avenue North

Movement	EBT	EBR	EBR2	WBT	WBR	NBT	NBR	NBR2	SBL2	SBL	SBT	SBR
Lane Configurations	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	11	12	12	12	12	12	12	12	12
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Frt	0.99	0.97	0.98	0.97	0.98	0.97	0.98	0.97	0.98	0.97	0.98	0.95
Flt Protected	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	3086	3086	3155	3155	3155	3155	3155	3155	3155	3155	3155	3155
Flt Permitted	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (perm)	3086	3016	3155	3016	3155	3155	3155	3155	3155	3155	3155	3155
Volume (vph)	1129	55	5	1137	285	1020	145	5	220	70	0	450
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	1152	56	5	1160	291	1041	148	5	224	71	0	459
RTOR Reduction (vph)	0	0	0	22	0	0	0	0	0	0	0	3
Lane Group Flow (vph)	1213	0	0	1429	0	1194	0	0	0	295	239	237
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	4
Turn Type	2	0	0	2	0	4	0	0	0	0	0	8
Protected Phases	2	0	0	2	0	4	0	0	0	0	0	8
Permitted Phases	2	0	0	2	0	4	0	0	0	0	0	8
Actuated Green, G (s)	26.0	26.0	26.0	32.4	32.4	32.4	32.4	32.4	22.6	60.0	60.0	60.0
Effective Green, g (s)	32.0	32.0	32.0	34.4	34.4	34.4	34.4	34.4	24.6	62.0	62.0	62.0
Actuated g/C Ratio	0.32	0.32	0.32	0.34	0.34	0.34	0.34	0.34	0.25	0.62	0.62	0.62
Clearance Time (s)	9.0	9.0	9.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	988	965	1085	965	1085	965	1085	965	392	826	839	839
v/s Ratio Prot	0.39	0.39	0.39	0.47	0.47	0.47	0.47	0.47	0.19	0.18	0.18	0.18
v/s Ratio Perm	1.23	1.23	1.23	1.48	1.48	1.48	1.48	1.48	0.75	0.29	0.28	0.28
Uniform Delay, d1	34.0	34.0	34.0	32.8	32.8	32.8	32.8	32.8	34.9	8.8	8.8	8.8
Progression Factor	0.99	0.99	0.99	0.53	0.53	0.53	0.53	0.53	1.00	1.00	1.00	1.00
Incremental Delay, d2	110.9	110.9	110.9	220.1	220.1	220.1	220.1	220.1	8.0	0.2	0.2	0.2
Delay (s)	144.6	144.6	144.6	238.2	238.2	238.2	238.2	238.2	42.8	9.0	8.9	8.9
Level of Service	F	F	F	F	F	F	F	F	D	A	A	A
Approach Delay (s)	144.6	144.6	144.6	238.2	238.2	238.2	238.2	238.2	21.9	21.9	21.9	21.9
Approach LOS	F	F	F	F	F	F	F	F	C	C	C	C
Intersection Summary												
HCM Average Control Delay	139.9											
HCM Volume to Capacity ratio	1.14											
Actuated Cycle Length (s)	100.0											
Intersection Capacity Utilization	109.5%											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis  
19: Denny Way & Dexter Avenue

2010 With-Project Conditions - PM Peak Hour

500 Fifth Avenue North



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔	↔↔	↔	↔↔	↔↔	↔	↔	↔↔	↔	↔	↔↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	0.95	1.00	0.95	1.00	0.95	1.00	0.99	1.00	0.95	1.00	0.95
Flt	1.00	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	1.00	0.85
Flt Protected	1.00	1.00	1.00	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3197	3210	3210	1464	2887	1593	3185	1425				
Flt Permitted	0.57	1.00	0.47	1.00	0.53	1.00	1.00	1.00	1.00	0.53	1.00	1.00
Satd. Flow (perm)	1817	3210	724	2887	891	3185	1425					
Volume (vph)	140	1259	10	0	1148	100	10	195	20	105	260	224
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	149	1339	11	0	1221	106	11	207	21	112	277	238
RTOR Reduction (vph)	0	0	0	0	4	0	0	10	0	0	0	188
Lane Group Flow (vph)	0	1499	0	0	1323	0	11	218	0	112	277	50
Heavy Vehicles (%)	1%	1%	1%	0%	0%	0%	11%	11%	11%	2%	2%	2%
Turn Type	pm+pt											
Protected Phases	2	5		1				3		3		3
Permitted Phases	5											
Actuated Green, G (s)	70.2	52.2	17.8	17.8	17.8	17.8	17.8	17.8	17.8	17.8	17.8	17.8
Effective Green, g (s)	73.2	55.2	20.8	20.8	20.8	20.8	20.8	20.8	20.8	20.8	20.8	20.8
Actuated g/C Ratio	0.73	0.55	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1537	1772	151	600	185	662	296					
v/s Ratio Prot	c0.15	0.41		0.08								
v/s Ratio Perm	c0.57	0.02	0.07	0.36	0.61	0.42	0.17					
v/c Ratio	0.98	0.75	0.07	0.36	0.61	0.42	0.17					
Uniform Delay, d1	12.5	17.1	31.8	33.9	35.9	34.4	32.5					
Progression Factor	0.94	0.58	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.1	2.7	0.2	0.4	5.5	0.4	0.3					
Delay (s)	14.9	12.6	32.1	34.3	41.4	34.8	32.8					
Level of Service	B	B	C	C	D	C	C	C	C	C	C	C
Approach Delay (s)	14.9	12.6		34.2		35.2						
Approach LOS	B	B		C		D						
Intersection Summary												
HCM Average Control Delay	18.8											
HCM Volume to Capacity ratio	0.88											
Actuated Cycle Length (s)	100.0											
Intersection Capacity Utilization	108.8%											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis  
20: Denny Way & Westlake Ave

2010 With-Project Conditions - PM Peak Hour

500 Fifth Avenue North



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width	12	11	12	12	12	11	12	11	12	12	12	12	
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	1.00	0.95	0.95	
Flt Protected	0.99	0.99	0.97	0.97	0.97	0.96	1.00	0.96	1.00	0.96	1.00	0.96	
Satd. Flow (prot)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	
Flt Permitted	3091	3022	3091	3022	3091	2994	1624	3111	1624	3111	1624	3111	
Satd. Flow (perm)	3091	3022	3091	3022	3091	2994	1624	3111	1624	3111	1624	3111	
Volume (vph)	0	1444	60	0	1103	255	0	610	200	85	115	45	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	
Adj. Flow (vph)	0	1536	64	0	1173	271	0	649	213	90	122	48	
RTOR Reduction (vph)	0	3	0	0	18	0	0	13	0	0	31	0	
Lane Group Flow (vph)	0	1597	0	0	1426	0	0	849	0	90	139	0	
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%	0%	0%	0%	
Turn Type	Perm												
Protected Phases	1	1					2		2				
Permitted Phases													
Actuated Green, G (s)	56.2	56.2					33.8		33.8				
Effective Green, g (s)	58.2	58.2					35.8		35.8				
Actuated g/C Ratio	0.58	0.58					0.36		0.36				
Clearance Time (s)	5.0	5.0					5.0		5.0				
Vehicle Extension (s)	3.0	3.0					3.0		3.0				
Lane Grp Cap (vph)	1799	1759					1072		96				
v/s Ratio Prot	c0.52	0.47					0.28		0.04				
v/s Ratio Perm													
v/c Ratio	0.89	0.81					0.79		0.94				
Uniform Delay, d1	18.1	16.5					28.8		31.0				
Progression Factor	0.62	1.00					1.00		1.00				
Incremental Delay, d2	6.5	4.2					4.1		70.9				
Delay (s)	17.7	20.7					32.8		101.9				
Level of Service	B	C					C		F				
Approach Delay (s)	17.7	20.7					32.8		49.4				
Approach LOS	B	C					C		D				
Intersection Summary													
HCM Average Control Delay	23.9					HCM Level of Service					C		
HCM Volume to Capacity ratio	0.91												
Actuated Cycle Length (s)	100.0					Sum of lost time (s)					6.0		
Intersection Capacity Utilization	88.1%					ICU Level of Service					E		
Analysis Period (min)	15												
c Critical Lane Group													

# HCM Signalized Intersection Capacity Analysis

21: Denny Way & Fairview Ave

500 Fifth Avenue North  
2010 With-Project Conditions - PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	12	11	11	12	9	10	12	10	10	12
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	0.97	0.95	1.00	0.95	1.00	0.95
Flt Protected	1.00	1.00	1.00	0.98	1.00	0.98	1.00	0.96	1.00	0.95	1.00	0.95
Satd. Flow (prot)	1555	3108	1555	3055	1555	3055	2808	2872	1501	2855	1501	2855
Flt Permitted	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	1555	3108	1555	3055	1555	3055	2808	2872	1501	2855	1501	2855
Volume (vph)	200	1105	5	45	749	100	424	490	200	225	300	145
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	208	1151	5	47	780	104	442	510	208	234	312	151
RTOR Reduction (vph)	0	0	0	0	11	0	0	48	0	0	62	0
Lane Group Flow (vph)	208	1156	0	47	874	0	442	670	0	234	401	0
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Turn Type	Prot	1	6	5	2	3	8	7	4	7	4	4
Protected Phases	1	6	5	2	3	8	7	4	7	4	4	4
Permitted Phases	1	6	5	2	3	8	7	4	7	4	4	4
Actuated Green, G (s)	15.3	37.9	5.4	28.0	18.1	27.7	9.0	18.6	15.3	37.9	5.4	28.0
Effective Green, g (s)	17.3	39.9	7.4	30.0	20.1	29.7	11.0	20.6	17.3	39.9	7.4	30.0
Actuated g/C Ratio	0.17	0.40	0.07	0.30	0.20	0.30	0.11	0.21	0.17	0.40	0.07	0.30
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	269	1240	115	917	564	853	165	588	269	1240	115	917
v/s Ratio Prot	c0.13	c0.37	0.03	0.29	c0.16	c0.23	c0.16	0.14	c0.13	c0.37	0.03	0.29
v/s Ratio Perm	0.77	0.93	0.41	0.95	0.78	0.79	1.42	0.88	0.77	0.93	0.41	0.95
Uniform Delay, d1	39.5	28.8	44.2	34.3	37.9	32.2	44.5	36.7	39.5	28.8	44.2	34.3
Progression Factor	1.00	1.00	0.89	1.25	1.00	1.00	1.09	0.82	1.00	1.00	0.89	1.25
Incremental Delay, d2	12.9	13.8	1.9	17.3	7.0	4.8	218.2	3.1	12.9	13.8	1.9	17.3
Delay (s)	52.4	42.5	41.2	60.1	44.9	37.0	266.8	33.1	52.4	42.5	41.2	60.1
Level of Service	D	D	D	E	D	D	F	C	D	D	D	E
Approach Delay (s)	44.0	59.2	40.0	40.0	40.0	40.0	111.5	F	44.0	59.2	40.0	40.0
Approach LOS	D	E	D	E	D	D	F	C	D	D	D	E
Intersection Summary												
HCM Average Control Delay	57.6											
HCM Volume to Capacity ratio	0.90											
Actuated Cycle Length (s)	100.0											
Intersection Capacity Utilization	88.2%											
Analysis Period (min)	15											
c Critical Lane Group												

# HCM Signalized Intersection Capacity Analysis

22: Denny Way & Stewart St

500 Fifth Avenue North  
2010 With-Project Conditions - PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	0.99	0.99	0.99	0.99
Flt Protected	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00	0.99	0.99	0.99	0.99
Satd. Flow (prot)	2970	1593	1676	1593	1676	1593	1676	1593	1676	1593	1676	1593
Flt Permitted	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Satd. Flow (perm)	2970	1593	1676	1593	1676	1593	1676	1593	1676	1593	1676	1593
Volume (vph)	0	763	797	315	829	0	0	0	0	135	980	70
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	0	779	813	321	846	0	0	0	0	138	1000	71
RTOR Reduction (vph)	0	48	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	1544	0	321	846	0	0	0	0	0	1200	0
Heavy Vehicles (%)	1%	1%	1%	2%	2%	2%	0%	0%	0%	11%	11%	11%
Turn Type	Prot	1	2	2	3	1	1	1	1	1	1	1
Protected Phases	3	2	2	3	1	1	1	1	1	1	1	1
Permitted Phases	3	2	2	3	1	1	1	1	1	1	1	1
Actuated Green, G (s)	43.5	21.5	69.5	43.5	21.5	69.5	21.5	69.5	21.5	69.5	21.5	69.5
Effective Green, g (s)	45.0	23.0	71.0	45.0	23.0	71.0	23.0	71.0	23.0	71.0	23.0	71.0
Actuated g/C Ratio	0.45	0.23	0.71	0.45	0.23	0.71	0.23	0.71	0.23	0.71	0.23	0.71
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1337	366	1190	1337	366	1190	366	1190	366	1190	366	1190
v/s Ratio Prot	c0.52	c0.20	0.50	c0.52	c0.20	0.50	c0.20	0.50	c0.52	c0.20	0.50	c0.52
v/s Ratio Perm	1.15	0.88	0.71	1.15	0.88	0.71	0.88	0.71	1.15	0.88	0.71	1.15
Uniform Delay, d1	27.5	37.1	8.5	27.5	37.1	8.5	37.1	8.5	27.5	37.1	8.5	37.1
Progression Factor	0.90	1.00	1.00	0.90	1.00	1.00	1.00	1.00	0.90	1.00	1.00	1.00
Incremental Delay, d2	78.0	24.4	2.0	78.0	24.4	2.0	24.4	2.0	78.0	24.4	2.0	78.0
Delay (s)	102.6	61.5	10.5	102.6	61.5	10.5	61.5	10.5	102.6	61.5	10.5	102.6
Level of Service	F	E	B	F	E	B	E	B	F	E	B	F
Approach Delay (s)	102.6	24.5	24.5	102.6	24.5	24.5	0.0	0.0	102.6	24.5	24.5	102.6
Approach LOS	F	C	C	F	C	C	A	A	F	C	C	F
Intersection Summary												
HCM Average Control Delay	68.0											
HCM Volume to Capacity ratio	1.04											
Actuated Cycle Length (s)	100.0											
Intersection Capacity Utilization	100.6%											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis  
 23: Yale St & Stewart St

2010 With-Project Conditions - PM Peak Hour

500 Fifth Avenue North



Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations		↑	↑		↑					↓	↑↑	↑↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91
Flt	1.00	1.00	0.85	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	1.00	1.00	1.00	0.95	1.00					0.95	1.00	1.00
Satd. Flow (prot)	1693	1439	1593	1676						1477	4241	
Flt Permitted	1.00	1.00	0.09	1.00						0.95	1.00	1.00
Satd. Flow (perm)	1693	1439	150	1676						1477	4241	
Volume (vph)	0	687	110	60	5	0	0	0	0	390	900	5
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	0	731	117	64	5	0	0	0	0	415	957	5
RTOR Reduction (vph)	0	0	45	0	0	0	0	0	0	0	1	0
Lane Group Flow (vph)	0	731	72	64	5	0	0	0	0	415	961	0
Heavy Vehicles (%)	1%	1%	1%	2%	2%	2%	0%	0%	0%	10%	10%	10%
Turn Type		Perm	Perm	Perm						Perm		
Protected Phases	3			3		3				1	2	
Permitted Phases		3		3		3				1	2	
Actuated Green, G (s)	43.5	43.5	43.5	43.5	43.5					47.5	47.5	
Effective Green, g (s)	45.0	45.0	45.0	45.0	45.0					49.0	49.0	
Actuated g/C Ratio	0.45	0.45	0.45	0.45	0.45					0.49	0.49	
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5							
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0							
Lane Grp Cap (vph)	762	648	68	754						724	2078	
v/s Ratio Prot	c0.43				0.00					c0.28	0.23	
v/s Ratio Perm		0.05	0.43									
v/c Ratio	0.96	0.11	0.94	0.01						0.57	0.46	
Uniform Delay, d1	26.6	15.9	26.2	15.2						18.1	16.8	
Progression Factor	0.80	0.25	1.05	1.18						0.73	0.68	
Incremental Delay, d2	18.5	0.1	68.6	0.0						0.3	0.1	
Delay (s)	39.8	4.0	96.1	17.9						13.5	11.5	
Level of Service	D	A	F	B						B	B	
Approach Delay (s)	34.9			90.4				0.0		12.1		
Approach LOS	C			F				A		B		
Intersection Summary												
HCM Average Control Delay	22.9	HCM Level of Service										
HCM Volume to Capacity ratio	0.76	C										
Actuated Cycle Length (s)	100.0	Sum of lost time (s)										
Intersection Capacity Utilization	77.9%	ICU Level of Service										
Analysis Period (min)	15	D										
Critical Lane Group												

HCM Signalized Intersection Capacity Analysis  
 24: Yale St & Howell St

2010 With-Project Conditions - PM Peak Hour

500 Fifth Avenue North



Movement	SEL	SET	SER	NWL
Lane Configurations	↖	↗	↖	↗
Ideal Flow (vphpl)	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0		
Lane Util. Factor	1.00	1.00		
Frt	1.00	1.00		
Flt Protected	0.95	1.00		
Satd. Flow (prot)	1593	1339		
Flt Permitted	0.95	1.00		
Satd. Flow (perm)	1593	1339		
Volume (vph)	50	1012	10	0
Peak-hour factor, PHF	0.96	0.96	0.96	0.96
Adj. Flow (vph)	52	1054	10	0
RTOR Reduction (vph)	0	0	0	0
Lane Group Flow (vph)	52	1064	0	0
Heavy Vehicles (%)	2%	2%	2%	0%
Parking (#/hr)		20		
Turn Type	Split			
Protected Phases	2	2		
Permitted Phases				
Actuated Green, G (s)	55.0	55.0		
Effective Green, g (s)	57.0	57.0		
Actuated g/C Ratio	0.57	0.57		
Clearance Time (s)	5.0	5.0		
Vehicle Extension (s)	3.0	3.0		
Lane Grp Cap (vph)	908	763		
v/s Ratio Prot	0.03	c0.79		
v/s Ratio Perm				
w/c Ratio	0.06	1.39		
Uniform Delay, d1	9.6	21.5		
Progression Factor	1.48	1.60		
Incremental Delay, d2	0.0	181.7		
Delay (s)	14.2	216.1		
Level of Service	B	F		
Approach Delay (s)		206.7		
Approach LOS		F		
Intersection Summary				
HCM Average Control Delay			152.2	HCM Level of Service
HCM Volume to Capacity ratio			1.41	
Actuated Cycle Length (s)			100.0	Sum of lost time (s)
Intersection Capacity Utilization			119.5%	ICU Level of Service
Analysis Period (min)			15	
c Critical Lane Group				



HCM Unsignalized Intersection Capacity Analysis  
 25: Harrison St & Site Access

2010 With-Project Conditions - PM Peak Hour

500 Fifth Avenue North



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	Free	Free	Free	Free	Stop	Stop
Sign Control	Free	Free	Free	Free	Stop	Stop
Grade	0%	0%	0%	0%	0%	0%
Volume (veh/h)	0	20	754	34	0	38
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	22	820	37	0	41
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage (veh)						
Upstream signal (ft)		173				
pX, platoon unblocked						
VC, conflicting volume	857				860	292
VC1, stage 1 conf vol						
VC2, stage 2 conf vol						
VCu, unblocked vol	857				860	292
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	94
cM capacity (veh/h)	780				295	705
Direction, Lane #	EB 1	WB 1	WB 2	WB 3	SB 1	SB 1
Volume Total	22	328	328	201	41	41
Volume Left	0	0	0	0	0	0
Volume Right	0	0	0	37	41	41
cSH	1700	1700	1700	1700	705	705
Volume to Capacity	0.01	0.19	0.19	0.12	0.06	0.06
Queue Length 95th (ft)	0	0	0	0	0	5
Control Delay (s)	0.0	0.0	0.0	0.0	10.4	10.4
Lane LOS					B	B
Approach Delay (s)	0.0	0.0			10.4	
Approach LOS					B	
Intersection Summary						
Average Delay				0.5		
Intersection Capacity Utilization				25.3%		
ICU Level of Service				A		
Analysis Period (min)				15		

HCM Unsignalized Intersection Capacity Analysis  
 26: Mercer St & Site Driveway

2010 With-Project Conditions - PM Peak Hour

500 Fifth Avenue North



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	Free	Free	Free	Free	Stop	Stop
Sign Control	Free	Free	Free	Free	Stop	Stop
Grade	0%	0%	0%	0%	0%	0%
Volume (veh/h)	1763	6	0	0	0	297
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	1959	7	0	0	0	330
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage (veh)						
Upstream signal (ft)	646			646		
pX, platoon unblocked						
VC, conflicting volume			1966		1962	493
VC1, stage 1 conf vol						
VC2, stage 2 conf vol						
VCu, unblocked vol			1966		1962	493
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	37
cM capacity (veh/h)			292		55	522
Direction, Lane #	EB 1	EB 2	EB 3	EB 4	NB 1	NB 1
Volume Total	560	560	560	287	330	330
Volume Left	0	0	0	0	0	0
Volume Right	0	0	0	7	330	330
cSH	1700	1700	1700	1700	522	522
Volume to Capacity	0.33	0.33	0.33	0.17	0.63	0.63
Queue Length 95th (ft)	0	0	0	0	109	109
Control Delay (s)	0.0	0.0	0.0	0.0	23.0	23.0
Lane LOS					C	C
Approach Delay (s)	0.0				23.0	
Approach LOS					C	
Intersection Summary						
Average Delay				3.3		
Intersection Capacity Utilization				50.7%		
ICU Level of Service				A		
Analysis Period (min)				15		



## Attachment E:      Parking Demand Calculation

## Expanded Phase 1 PARKING DEMAND CALCULATIONS

### Initial TMP

Office Building Area	600,000	
Employee Density - Office	3.29	(employees/1,000 square feet)
<b>EMPLOYEES</b>	<b>1974</b>	

Percent Employees On-Site	85%
<b>EMPLOYEES ON-SITE</b>	<b>1678</b>

<b>MODE SPLIT - Office</b>		<b>PEOPLE</b>
SOV	80%	1342
Carpool	10%	168
Transit/Other	10%	168

<b><u>PARKING STALL DEMAND</u></b>		<b><u>PARKING STALLS</u></b>
Office = 600,000		
Vehicles (AVO = 1.0/2.3)		1415
Short-term office parking (0.10 Stalls/1,000 SF)		60
Office Subtotal		<u>1475</u>

**OFFICE PARKING DEMAND (STALLS) = 1475**

500 Fifth Avenue North  
Parking Demand Calculations  
The Transpo Group

## Expanded Phase 1 PARKING DEMAND CALCULATIONS

### Short-Term TMP

Office Building Area	600,000	
Employee Density - Office	3.29	(employees/1,000 square feet)
<b>EMPLOYEES</b>	<b>1974</b>	

Percent Employees On-Site	85%
<b>EMPLOYEES ON-SITE</b>	<b>1678</b>

MODE SPLIT - Office		PEOPLE
SOV	70%	1175
Carpool	15%	252
Transit/Other	15%	252

<u>PARKING STALL DEMAND</u>		<u>PARKING STALLS</u>
Office =	600,000	
Vehicles (AVO = 1.0/2.3)		1285
Short-term office parking (0.10 Stalls/1,000 SF)		60
Office Subtotal		<u>1345</u>

**OFFICE PARKING DEMAND (STALLS) = 1345**

## Expanded Phase 1 PARKING DEMAND CALCULATIONS

### Long-Term TMP

Office Building Area	600,000	
Employee Density - Office	3.29	(employees/1,000 square feet)
<b>EMPLOYEES</b>	<b>1974</b>	

Percent Employees On-Site	85%
<b>EMPLOYEES ON-SITE</b>	<b>1678</b>

<b>MODE SPLIT - Office</b>		<b>PEOPLE</b>
SOV	50%	839
Carpool	20%	336
Transit/Other	30%	503

<b><u>PARKING STALL DEMAND</u></b>		<b><u>PARKING STALLS</u></b>
Office =	600,000	
Vehicles (AVO = 1.0/2.3)		985
Short-term office parking (0.10 Stalls/1,000 SF)		60
Office Subtotal		<u>1045</u>

**OFFICE PARKING DEMAND (STALLS) = 1045**